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Foundations of the Theory of Signs

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Nemo autem vereri debet ne characterum contemplatio nos a rebus abducat, imo contra ad intima rerum ducet.—GOTTFRIED LEIBNIZ

I. Introduction

1. Semiotic and Science

Men are the dominant sign-using animals. Animals other than man do, of course, respond to certain things as signs of something else, but such signs do not attain the complexity and elaboration which is found in human speech, writing, art, testing devices, medical diagnosis, and signaling instruments. Science and signs are inseparately interconnected, since science both presents men with more reliable signs and embodies its results in systems of signs. Human civilization is dependent upon signs and systems of signs, and the human mind is inseparable from the functioning of signs—if indeed mentality is not to be identified with such functioning.

It is doubtful if signs have ever before been so vigorously studied by so many persons and from so many points of view. The army of investigators includes linguists, logicians, philosophers, psychologists, biologists, anthropologists, psychopathologists, aestheticians, and sociologists. There is lacking, however, a theoretical structure simple in outline and yet comprehensive enough to embrace the results obtained from different points of view and to unite them into a unified and consistent whole. It is the purpose of the present study to suggest this unifying point of view and to sketch the contours of the science of signs. This can be done only in a fragmentary fashion, partly because of the limitations of space, partly because of the undeveloped state of the science itself, but mainly because of the

purpose which such a study aims to serve by its inclusion in this *Encyclopedia.*

Semiotic has a double relation to the sciences: it is both a science among the sciences and an instrument of the sciences. The significance of semiotic as a science lies in the fact that it is a step in the unification of science, since it supplies the foundations for any special science of signs, such as linguistics, logic, mathematics, rhetoric, and (to some extent at least) aesthetics. The concept of sign may prove to be of importance in the unification of the social, psychological, and humanistic sciences in so far as these are distinguished from the physical and biological sciences. And since it will be shown that signs are simply the objects studied by the biological and physical sciences related in certain complex functional processes, any such unification of the formal sciences on the one hand, and the social, psychological, and humanistic sciences on the other, would provide relevant material for the unification of these two sets of sciences with the physical and biological sciences. Semiotic may thus be of importance in a program for the unification of science, though the exact nature and extent of this importance is yet to be determined.

But if semiotic is a science co-ordinate with the other sciences, studying things or the properties of things in their function of serving as signs, it is also the instrument of all sciences, since every science makes use of and expresses its results in terms of signs. Hence metascience (the science of science) must use semiotic as an organon. It was noticed in the essay "Scientific Empiricism" (Vol. I, No. 1) that it is possible to include without remainder the study of science under the study of the language of science, since the study of that language involves not merely the study of its formal structure but its relation to objects designated and to the persons who use it. From this point of view the entire *Encyclopedia*, as a scientific study of science, is a study of the language of science. But since nothing can be studied without signs denoting the objects in the field to be studied, a study of the language of science must make use of signs referring to signs—and semiotic must supply the rele-

vant signs and principles for carrying on this study. Semiotic supplies a general language applicable to any special language or sign, and so applicable to the language of science and specific signs which are used in science.

The interest in presenting semiotic as a science and as part of the unification of science must here be restricted by the practical motive of carrying the analysis only so far and in such directions as to supply a tool for the work of the *Encyclopedia*, i.e., to supply a language in which to talk about, and in so doing to improve, the language of science. Other studies would be necessary to show concretely the results of sign analysis applied to special sciences and the general significance for the unification of science of this type of analysis. But even without detailed documentation it has become clear to many persons today that man—including scientific man—must free himself from the web of words which he has spun and that language—including scientific language—is greatly in need of purification, simplification, and systematization. The theory of signs is a useful instrument for such debabelization.

II. Semiosis and Semiotic

2. The Nature of a Sign

The process in which something functions as a sign may be called *semiosis*. This process, in a tradition which goes back to the Greeks, has commonly been regarded as involving three (or four) factors: that which acts as a sign, that which the sign refers to, and that effect on some interpreter in virtue of which the thing in question is a sign to that interpreter. These three components in semiosis may be called, respectively, the *sign vehicle*, the *designatum*, and the *interpretant;* the *interpreter* may be included as a fourth factor. These terms make explicit the factors left undesignated in the common statement that a sign refers to something for someone.

A dog responds by the type of behavior (I) involved in the hunting of chipmunks (D) to a certain sound (S); a traveler prepares himself to deal appropriately (I) with the geographical region (D) in virtue of the letter (S) received from a friend. In

such cases S is the sign vehicle (and a sign in virtue of its functioning), D the designatum, and I the interpretant of the interpreter. The most effective characterization of a sign is the following: S is a sign of D for I to the degree that I takes account of D in virtue of the presence of S. Thus in semiosis something takes account of something else mediately, i.e., by means of a third something. Semiosis is accordingly a mediated-taking-account-of. The mediators are *sign vehicles;* the takings-account-of are *interpretants;* the agents of the process are *interpreters;* what is taken account of are *designata.* There are several comments to be made about this formulation.

It should be clear that the terms 'sign,' 'designatum,' 'interpretant,' and 'interpreter' involve one another, since they are simply ways of referring to aspects of the process of semiosis. Objects need not be referred to by signs, but there are no designata unless there is such reference; something is a sign only because it is interpreted as a sign of something by some interpreter; a taking-account-of-something is an interpretant only in so far as it is evoked by something functioning as a sign; an object is an interpreter only as it mediately takes account of something. The properties of being a sign, a designatum, an interpreter, or an interpretant are relational properties which things take on by participating in the functional process of semiosis. Semiotic, then, 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. The importance of this point will become progressively clearer.

Signs which refer to the same object need not have the same designata, since that which is taken account of in the object may differ for various interpreters. A sign of an object may, at one theoretical extreme, simply turn the interpreter of the sign upon the object, while at the other extreme it would allow the interpreter to take account of all the characteristics of the object in question in the absence of the object itself. There is thus a potential sign continuum in which with respect to every object or situation all degrees of semiosis may be expressed, and the question as to what the designatum of a sign is in any given

situation is 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.

A sign must have a designatum; yet obviously every sign does not, in fact, refer to an actual existent object. The difficulties which these statements may occasion are only apparent difficulties and need no introduction of a metaphysical realm of "subsistence" for their solution. Since 'designatum' is a semiotical term, there cannot be designata without semiosis—but there can be objects without there being semiosis. The designatum of a sign is the kind of object which the sign applies to, i.e., the objects with the properties which the interpreter takes account of through the presence of the sign vehicle. And the taking-account-of may occur without there actually being objects or situations with the characteristics taken account of. This is true even in the case of pointing: one can for certain purposes point without pointing to anything. No contradiction arises in saying that every sign has a designatum but not every sign refers to an actual existent. Where what is referred to actually exists as referred to the object of reference is a *denotatum*. It thus becomes clear that, while every sign has a designatum, not every sign has a denotatum. A designatum is not a thing, but a kind of object or class of objects—and a class may have many members, or one member, or no members. The denotata are the members of the class. This distinction makes explicable the fact that one may reach in the icebox for an apple that is not there and make preparations for living on an island that may never have existed or has long since disappeared beneath the sea.

As a last comment on the definition of sign, it should be noted that the general theory of signs need not commit itself to any specific theory of what is involved in taking account of something through the use of a sign. Indeed, it may be possible to take 'mediated-taking-account-of' as the single primitive term for the axiomatic development of semiotic. Nevertheless, the account which has been given lends itself to treatment from the point of view of behavioristics, and this point of view

will be adopted in what follows. This interpretation of the definition of sign is not, however, necessary. It is adopted here because such a point of view has in some form or other (though not in the form of Watsonian behaviorism) become widespread among psychologists, and because many of the difficulties which the history of semiotic reveals seem to be due to the fact that through most of its history semiotic linked itself with the faculty and introspective psychologies. From the point of view of behavioristics, to take account of D by the presence of S involves responding to D in virtue of a response to S. As will be made clear later, it is not necessary to deny "private experiences" of the process of semiosis or of other processes, but it is necessary from the standpoint of behavioristics to deny that such experiences are of central importance or that the fact of their existence makes the objective study of semiosis (and hence of sign, designatum, and interpretant) impossible or even incomplete.

3. Dimensions and Levels of Semiosis

In terms of the three correlates (sign vehicle, designatum, interpreter) of the triadic relation of semiosis, a number of other dyadic relations may be abstracted for study. One may study the relations of signs to the objects to which the signs are applicable. This relation will be called the *semantical dimension of semiosis*, symbolized by the sign 'D_{sem}'; the study of this dimension will be called *semantics*. Or the subject of study may be the relation of signs to interpreters. This relation will be called the *pragmatical dimension of semiosis*, symbolized by 'D_p,' and the study of this dimension will be named *pragmatics*.

One important relation of signs has not yet been introduced: the formal relation of signs to one another. This relationship was not, in the preceding account, explicitly incorporated in the definition of 'sign,' since current usage would not seem to eliminate the possibility of applying the term 'sign' to something which was not a member of a system of signs—such possibilities are suggested by the sign aspects of perception and by various apparently isolated mnemonic and signaling devices.

Nevertheless, the interpretation of these cases is not perfectly clear, and it is very difficult to be sure that there is such a thing as an isolated sign. Certainly, potentially, if not actually, every sign has relations to other signs, for what it is that the sign prepares the interpreter to take account of can only be *stated* in terms of other signs. It is true that this statement need not be made, but it is always in principle capable of being made, and when made relates the sign in question to other signs. Since most signs are clearly related to other signs, since many apparent cases of isolated signs prove on analysis not to be such, and since all signs are potentially if not actually related to other signs, it is well to make a third dimension of semiosis co-ordinate with the other two which have been mentioned. This third dimension will be called the *syntactical dimension of semiosis*, symbolized by 'D_{syn},' and the study of this dimension will be named *syntactics*.

It will be convenient to have special terms to designate certain of the relations of signs to signs, to objects, and to interpreters. '*Implicates*' will be restricted to D_{syn}, '*designates*' and '*denotes*' to D_{sem}, and '*expresses*' to D_p. The word 'table' implicates (but does *not* designate) 'furniture with a horizontal top on which things may be placed,' designates a certain kind of object (furniture with a horizontal top on which things may be placed), denotes the objects to which it is applicable, and expresses its interpreter. In any given case certain of the dimensions may actually or practically vanish: a sign may not have syntactical relations to other signs and so its actual implication becomes null; or it may have implication and yet denote no object; or it may have implication and yet no actual interpreter and so no expression—as in the case of a word in a dead language. Even in such possible cases the terms chosen are convenient to refer to the fact that certain of the possible relations remain unrealized.

It is very important to distinguish between the relations which a given sign sustains and the signs used in talking about such relations—the full recognition of this is perhaps the most important general practical application of semiotic. The func-

tioning of signs is, in general, a way in which certain existences take account of other existences through an intermediate class of existences. But there are levels of this process which must be carefully distinguished if the greatest confusion is not to result. Semiotic as the science of semiosis is as distinct from semiosis as is any science from its subject matter. If x so functions that y takes account of z through x, then we may say that x is a sign, and that x designates z, etc.; but here 'sign,' and 'designates' are signs in a higher order of semiosis referring to the original and lower-level process of semiosis. What is now designated is a certain relation of x and z and not z alone; x is designated, z is designated, and a relation is designated such that x becomes a sign and z a designatum. Designation may therefore occur at various levels, and correspondingly there are various levels of designata; 'designation' reveals itself to be a sign within semiotic (and specifically within semantics), since it is a sign used in referring to signs.

Semiotic as a science makes use of special signs to state facts about signs; it is a language to talk about signs. Semiotic has the three subordinate branches of syntactics, semantics, and pragmatics, dealing, respectively, with the syntactical, the semantical, and the pragmatical dimensions of semiosis. Each of these subordinate sciences will need its own special terms; as previously used 'implicates' is a term of syntactics, 'designates' and 'denotes' are terms of semantics, and 'expresses' is a term of pragmatics. And since the various dimensions are only aspects of a unitary process, there will be certain relations between the terms in the various branches, and distinctive signs will be necessary to characterize these relations and so the process of semiosis as a whole. 'Sign' itself is a strictly semiotical term, not being definable either within syntactics, semantics, or pragmatics alone; only in the wider use of 'semiotical' can it be said that all the terms in these disciplines are semiotical terms.

It is possible to attempt to systematize the entire set of terms and propositions dealing with signs. In principle, semiotic could

be presented as a deductive system, with undefined terms and primitive sentences which allow the deduction of other sentences as theorems. But though this is the form of presentation to which science strives, and though the fact that semiotic deals exclusively with relations makes it peculiarly fit for treatment by the new logic of relations, yet it is neither advisable nor possible in the present monograph to attempt this type of exposition. It is true that much has been accomplished in the general analysis of sign relations by the formalists, the empiricists, and the pragmatists, but the results which have been attained seem to be but a small part of what may be expected; the preliminary systematization in the component fields has hardly begun. For such reasons, as well as because of the introductory function of this monograph, it has not seemed advisable to attempt a formalization of semiotic which goes much beyond the existing status of the subject, and which might obscure the role which semiotic is fitted to play in the erection of unified science.

Such a development remains, however, as the goal. Were it obtained it would constitute what might be called *pure semiotic*, with the component branches of pure syntactics, pure semantics, and pure pragmatics. Here would be elaborated in systematic form the metalanguage in terms of which all sign situations would be discussed. The application of this language to concrete instances of signs might then be called *descriptive semiotic* (or syntactics, semantics, or pragmatics as the case may be). In this sense the present *Encyclopedia*, in so far as it deals with the language of science, is an especially important case of descriptive semiotic, the treatment of the structure of that language falling under descriptive syntactics, the treatment of the relation of that language to existential situations falling under descriptive semantics, and the consideration of the relation of that language to its builders and users being an instance of descriptive pragmatics. The *Encyclopedia* as a whole, from the point of view expressed in this monograph, falls within the province of pure and descriptive semiotic.

4. Language

The preceding account is applicable to all signs, however simple or complex. Hence it is applicable to languages as a particular kind of sign system. The term 'language,' in common with most terms which have to do with signs, is ambiguous, since its characterization may be given in terms of the various dimensions. Thus the formalist is inclined to consider any axiomatic system as a language, regardless of whether there are any things which it denotes, or whether the system is actually used by any group of interpreters; the empiricist is inclined to stress the necessity of the relation of signs to objects which they denote and whose properties they truly state; the pragmatist is inclined to regard a language as a type of communicative activity, social in origin and nature, by which members of a social group are able to meet more satisfactorily their individual and common needs. The advantage of the three-dimensional analysis is that the validity of all these points of view can be recognized, since they refer to three aspects of one and the same phenomenon; where convenient the type of consideration (and hence of abstraction) can be indicated by 'L_{syn},' 'L_{sem},' or 'L_p.' It has already been noted that a sign may not denote any actual objects (i.e., have no denotatum) or may not have an actual interpreter. Similarly, there may be languages, as a kind of sign complex, which at a given time are applied to nothing, and which have a single interpreter or even no interpreter, just as an unoccupied building may be called a house. It is not possible, however, to have a language if the set of signs have no syntactical dimension, for it is not customary to call a single sign a language. Even this case is instructive, for in terms of the view expressed (namely, that potentially every sign has syntactical relations to those signs which would state its designatum, that is, the kind of situation to which it is applicable) even an isolated sign is potentially a linguistic sign. It could also be said that an isolated sign has certain relations to itself, and so a syntactical dimension, or that having a null syntactical dimension is only a special case of having a syn-

tactical dimension. These possibilities are important in showing the degree of independence of the various dimensions and consequently of L_{syn}, L_{sem}, and L_p. They also show that there is no absolute cleft between single signs, sentential signs, and languages—a point which Peirce especially stressed.

A language, then, as a system of interconnected signs, has a syntactical structure of such a sort that among its permissible sign combinations some can function as statements, and sign vehicles of such a sort that they can be common to a number of interpreters. The syntactical, semantical, and pragmatical features of this characterization of language will become clearer when the respective branches of semiotic are considered. It will also become clear that just as an individual sign is completely characterized by giving its relation to other signs, objects, and its users, so a language is completely characterized by giving what will later be called the syntactical, semantical, and pragmatical rules governing the sign vehicles. For the moment it should be noted that the present characterization of language is a strictly semiotical one, involving reference to all three dimensions; much confusion will be avoided if it is recognized that the word 'language' is often used to designate some aspect of what is language in the full sense. The simple formula, $L = L_{syn} + L_{sem} + L_p$, helps to clarify the situation.

Languages may be of various degrees of richness in the complexity of their structure, the range of things they designate, and the purposes for which they are adequate. Such natural languages as English, French, German, etc., are in these respects the richest languages and have been called *universal languages,* since in them everything can be represented. This very richness may, however, be a disadvantage for the realization of certain purposes. In the universal languages it is often very difficult to know within which dimension a certain sign is predominantly functioning, and the various levels of symbolic reference are not clearly indicated. Such languages are therefore ambiguous and give rise to explicit contradictions—facts which in some connections (but not in all!) are disadvantageous. The very devices which aid scientific clarity may

weaken the potentialities for the aesthetic use of signs, and vice versa. Because of such considerations it is not surprising that men have developed certain special and restricted languages for the better accomplishment of certain purposes: mathematics and formal logic for the exhibition of syntactical structure, empirical science for more accurate description and prediction of natural processes, the fine and applied arts for the indication and control of what men have cherished. The everyday language is especially weak in devices to talk about language, and it is the task of semiotic to supply a language to meet this need. For the accomplishment of their own ends these special languages may stress certain of the dimensions of sign-functioning more than others; nevertheless, the other dimensions are seldom if ever completely absent, and such languages may be regarded as special cases falling under the full semiotical characterization of language which has been suggested.

The general origin of systems of interconnected signs is not difficult to explain. Sign vehicles as natural existences share in the connectedness of extraorganic and intraorganic processes. Spoken and sung words are literally parts of organic responses, while writing, painting, music, and signals are the immediate products of behavior. In the case of signs drawn from materials other than behavior or the products of behavior—as in the sign factors in perception—the signs become interconnected because the sign vehicles are interconnected. Thunder becomes a sign of lightning and lightning a sign of danger just because thunder and lightning and danger are, in fact, interconnected in specific ways. If w expects x on the presence of y, and z on the presence of x, the interconnectedness of the two expectations makes it very natural for w to expect z on the presence of y. From the interconnectedness of events on the one hand, and the interconnectedness of actions on the other, signs become interconnected, and language as a system of signs arises. That the syntactical structure of language is, in general, a function both of objective events and of behavior, and not of either alone, is a thesis which may be called *the dual control of linguistic structure*. This thesis will receive elaboration later,

but it should be already evident that it gives a way of avoiding the extremes of both conventionalism and the traditional empiricism in accounting for linguistic structure. For the reasons given, sets of signs tend to become systems of signs; this is as true in the case of perceptual signs, gestures, musical tones, and painting as it is in the case of speech and writing. In some cases the systematization is relatively loose and variable and may include subsystems of various degrees of organization and interconnectedness; in others it is relatively close and stable, as in the case of mathematical and scientific languages. Given such sign structures, it is possible to subject them to a three-dimensional analysis, investigating their structure, their relation to what they denote, and their relations to their interpreters. This will now be done in general terms, discussing in turn the syntactics, semantics, and pragmatics of language, but keeping in mind throughout the relation of each dimension, and so each field of semiotic, to the others. Later, after making use of the abstractions involved in this treatment, we will specifically stress the unity of semiotic.

III. Syntactics

5. The Formal Conception of Language

Syntactics, as the study of the syntactical relations of signs to one another in abstraction from the relations of signs to objects or to interpreters, is the best developed of all the branches of semiotic. A great deal of the work in linguistics proper has been done from this point of view, though often unconsciously and with many confusions. Logicians have from the earliest times been concerned with inference, and this, though historically overlaid with many other considerations, involves the study of the relations between certain combinations of signs within a language. Especially important has been the early presentation by the Greeks of mathematics in the form of a deductive or axiomatic system; this has kept constantly before men's attention the pattern of a closely knit system of signs such that by means of operations upon certain initial sets all the other sets of signs are obtained. Such formal

systems presented the material whose considerations made inevitable the development of syntactics. It was in Leibniz the mathematician that linguistic, logical, and mathematical considerations jointly led to the conception of a general formal art (*speciosa generalis*) which included the general characteristic art (*ars characteristica*), essentially a theory and art of so forming signs that all consequences of the corresponding "ideas" could be drawn by a consideration of the signs alone, and the general combinatory art (*ars combinatoria*), a general calculus giving a universal formal method of drawing the consequences from signs. This unification and generalization of mathematical form and method has received since Leibniz' time a remarkable extension in symbolic logic, through the efforts of Boole, Frege, Peano, Peirce, Russell, Whitehead, and others, while the theory of such syntactical relations has received its most elaborate contemporary development in the logical syntax of Carnap. For present purposes only the most general aspect of this point of view need be mentioned, especially since Carnap treats this question in Volume I, Numbers 1 and 3.

Logical syntax deliberately neglects what has here been called the semantical and the pragmatical dimensions of semiosis to concentrate upon the logico-grammatical structure of language, i.e., upon the syntactical dimension of semiosis. In this type of consideration a "language" (i.e., L_{syn}) becomes any set of things related in accordance with two classes of rules: *formation rules*, which determine permissible independent combinations of members of the set (such combinations being called sentences), and *transformation rules*, which determine the sentences which can be obtained from other sentences. These may be brought together under the term '*syntactical rule*.' Syntactics is, then, the consideration of signs and sign combinations in so far as they are subject to syntactical rules. It is not interested in the individual properties of the sign vehicles or in any of their relations except syntactical ones, i.e., relations determined by syntactical rules.

Investigated from this point of view, languages have proved to be unexpectedly complex, and the point of view unexpectedly

fruitful. It has been possible accurately to characterize primitive, analytic, contradictory, and synthetic sentences, as well as demonstration and derivation. Without deserting the formal point of view, it has proved possible to distinguish logical and descriptive signs, to define synonymous signs and equipollent sentences, to characterize the content of a sentence, to deal with the logical paradoxes, to classify certain types of expressions, and to clarify the modal expressions of necessity, possibility, and impossibility. These and many other results have been partially systematized in the form of a language, and most of the terms of logical syntax may be defined in terms of the notion of consequence. The result is that there is today available a more precise language for talking about the formal dimension of languages than has ever before existed. Logical syntax has given results of high intrinsic interest and furnished a powerful analytical tool; it will be used extensively in the analysis of the language of science in this *Encyclopedia.*

Our present interest, however, is solely with the relation of logical syntax to semiotic. It is evident that it falls under syntactics; it has indeed suggested this name. All the results of logical syntax are assimilable by syntactics. Further, it is without doubt the most highly developed part of syntactics, and so of semiotic. In its spirit and method it has much to contribute to semantics and pragmatics, and there is evidence that its influence is at work in these fields.

Many of its specific results have analogues in the other branches of semiotic. As an illustration let us use the term *'thing-sentence,'* to designate any sentence whose designatum does not include signs; such a sentence is about things and may be studied by semiotic. On this usage none of the sentences of the semiotical languages are thing-sentences. Now Carnap has made clear the fact that many sentences which are apparently thing-sentences, and so about objects which are not signs, turn out under analysis to be pseudo thing-sentences which must be interpreted as syntactical statements about language. But in analogy to these quasi-syntactical sentences there are corresponding quasi-semantical and quasi-pragmatical sentences

which appear to be thing-sentences but which must be interpreted in terms of the relation of signs to designata or the relation of signs to interpreters.

Syntactics is in some respects easier to develop than its coordinate fields, since it is somewhat easier, especially in the case of written signs, to study the relations of signs to one another as determined by rule than it is to characterize the existential situations under which certain signs are employed or what goes on in the interpreter when a sign is functioning. For this reason the isolation of certain distinctions by syntactical investigation gives a clue for seeking their analogues in semantical and pragmatical investigations.

In spite of the importance thus ascribed to logical syntax, it cannot be equated with syntactics as a whole. For it (as the term 'sentence' shows) has limited its investigation of syntactical structure to the type of sign combinations which are dominant in science, namely, those combinations which from a semantical point of view are called statements, or those combinations used in the transformation of such combinations. Thus on Carnap's usage commands are not sentences, and many lines of verse would not be sentences. 'Sentence' is not, therefore, a term which in his usage applies to every independent sign combination permitted by the formation rules of a language—and yet clearly syntactics in the wide sense must deal with all such combinations. There are, then, syntactical problems in the fields of perceptual signs, aesthetic signs, the practical use of signs, and general linguistics which have not been treated within the framework of what today is regarded as logical syntax and yet which form part of syntactics as this is here conceived.

6. Linguistic Structure

Let us now consider more carefully linguistic structure, invoking semantics and pragmatics where they may be of help in clarifying the syntactical dimension of semiosis.

Given a plurality of signs used by the same interpreter, there is always the possibility of certain syntactical relations between

the signs. If there are two signs, S_1 and S_2, so used that S_1 (say 'animal') is applied to every object to which S_2 (say 'man') is applied, but not conversely, then in virtue of this usage the semiosis involved in the functioning of S_1 is included in that of S_2; an interpreter will respond to an object denoted by 'man' with the responses he would make to an object denoted by 'animal,' but in addition there are certain responses which would not be made to any animal to which 'man' was not applicable and which would not be made to an animal to which certain other terms (such as 'amoeba') were applicable. In this way terms gain relations among themselves corresponding to the relations of the responses of which the sign vehicles are a part, and these modes of usage are the pragmatical background of the formation and transformation rules. The syntactical structure of a language is the interrelationship of signs caused by the interrelationship of the responses of which the sign vehicles are products or parts. The formalist substitutes for such responses their formulation in signs; when he begins with an arbitrary set of rules, he is stipulating the interrelationship of responses which possible interpreters must have before they can be said to be using the language under consideration.

In so far as a single sign (such as a particular act of pointing) can denote only a single object, it has the status of an index; if it can denote a plurality of things (such as the term 'man'), then it is combinable in various ways with signs which explicate or restrict the range of its application; if it can denote everything (such as the term 'something'), then it has relations with every sign, and so has universal implication, that is to say, it is implicated by every sign within the language. These three kinds of signs will be called, respectively, *indexical signs*, *characterizing signs*, and *universal signs*.

Signs may thus differ in the degree to which they determine definite expectations. To say 'something is being referred to' does not give rise to definite expectations, does not allow taking account of what is being referred to; to use 'animal' with no further specification awakens certain sets of response, but they are not particularized sufficiently to deal adequately with a

specific animal; it is an improvement in the situation to use 'man,' as is evident in the contrast between knowing that an animal is coming and that a man is coming; finally, the use of 'this' in an actual situation with the supplementary help of bodily orientation directs behavior upon a specific object but gives a minimum of expectations concerning the character of what is denoted. Universal signs may have a certain importance in allowing one to talk in general of the designata of signs without having to specify the sign or designatum; the difficulty of attempting to avoid such terms as 'object,' 'entity,' and 'something' shows the value of such terms for certain purposes. More important, however, is the combination of indexical and characterizing signs (as in 'that horse runs') since such a combination gives the definiteness of reference of the indexical sign plus the determinateness of the expectation involved in the characterizing sign. It is the complex forms of such combinations that are dealt with formally in the sentences of logical and mathematical systems, and to which (considered semantically) the predicates of truth and falsity apply. This importance is reflected in the fact that all formal systems show a differentiation of two kinds of signs corresponding to indexical and characterizing signs. Further, the fact that the determinateness of expectation can be increased by the use of additional signs is reflected in the fact that linguistic structures provide a framework which permits of degrees of specification and makes clear the sign relations involved.

To use terms suggested by M. J. Andrade, it may be said that every sentence contains a *dominant sign* and certain *specifiers*, these terms being relative to each other, since what is a dominant sign with respect to certain specifiers may itself be a specifier with respect to a more general dominant sign—thus 'white' may make the reference to horses more specific, while 'horse' may itself be a specifier with respect to 'animal.' Since an adequate taking-account-of-something demands an indication of both its location and (relevant) properties, and since the relevant degree of specification is obtained by a combination of characterizing signs, a sentence capable of truth and falsity

involves indexical signs, a dominant characterizing sign with possibly characterizing specifiers, and some signs to show the relation of the indexical and characterizing signs to one another and to the members of their own class. Hence the general formula of such a sentence:

Dominant characterizing sign [characterizing specifiers (indexical signs)]

In such a sentence as 'That white horse runs slowly,' spoken in an actual situation with indexical gestures, 'runs' may be taken as the dominant sign, and 'slowly' as a characterizing specifier specifies 'runs'; 'horse' similarly specifies the possible cases of 'runs slowly,' 'white' carries the specification further, and 'that' in combination with the indexical gesture serves as an indexical sign to locate the object to which the dominant sign as now specified is to be applied. The conditions of utterance might show that 'horse' or some other sign is to be taken as the dominant sign, so that pragmatical considerations determine what, in fact, is the dominant sign. The dominant sign may even be more general than any which have been mentioned: it may be a sign to show that what follows is a declaration or a belief held with a certain degree of conviction. Instead of the use of the indexical sign in an actual situation, characterizing signs might be so used as to inform the hearer how to supply the indexical sign: 'Find the horse such that . . . .; it is that horse to which reference is being made'; or 'Take any horse; then that horse. . . . .' In case a set of objects is referred to, the reference may be to all of the set, to a portion, or to some specified member or members; terms such as 'all,' 'some,' 'three,' together with indexical signs and descriptions, perform this function of indicating which of the possible denotata of a characterizing sign are referred to. There need not be only a single indexical sign; in such a sentence as '*A* gave *B* to *C*,' there are three correlates of the triadic relation to be specified by indexical signs, either used alone or in connection with other devices.

The sign 'to' in the sentence '*A* gave *B* to *C*' serves as an occasion for stressing an important point: to have intelligible sign combinations it is necessary to have special signs within

the language in question to indicate the relation of other signs, and such signs, being in the language in question, must be distinguished from those signs in the language of syntactics which designate these relations. In the English examples which have been given, the 's' in 'runs,' the 'ly' in 'slowly,' the position of 'that' and 'white' with reference to the position of 'horse,' the positions of '*A*' and '*B*' before and after the dominant sign 'gives,' the position of 'to' before '*C*' all furnish indications as to which sign specifies which other sign, or which indexical sign denotes which correlate of the relation, or which signs are indexical signs and which are characterizing signs. Pauses, speech melodies, and emphasis help to perform such functions in spoken language; punctuation marks, accents, parentheses, italics, size of letter, etc., are similar aids in written and printed languages. Such signs within the language perform primarily a pragmatical function, but the term 'parenthesis' and its implicates occur in the metalanguage. The metalanguage must not be confused with a language to which it refers, and in the language itself a distinction must be made between those signs whose designata fall outside the language and those signs which indicate the relation of other signs.

All the distinctions which have been recognized as involved in the functioning of language in the full semiotical sense are reflected in the features of language which syntactics has thus far studied. Syntactics recognizes classes of signs, such as individual constants and variables, and predicate constants and variables, which are the formal correlates of various kinds of indexical and characterizing signs; the operators correspond to class specifiers; dots, parentheses, and brackets are devices within the language for indicating certain relations between the signs; terms such as 'sentence,' 'consequence,' and 'analytic' are syntactical terms for designating certain kinds of sign combinations and relations between signs; sentential (or "propositional") functions correspond to sign combinations lacking certain indexical specifiers necessary for complete sentences ("propositions"); the formation and transformation rules correspond to the way in which signs are combined or derived from

one another by actual or possible users of the language. In this way the formalized languages studied in contemporary logic and mathematics clearly reveal themselves to be the formal structure of actual and possible languages of the type used in making statements about things; at point after point they reflect the significant features of language in actual use. The deliberate neglect by the formalist of other features of language, and the ways in which language changes, is an aid in isolating a particular object of interest: linguistic structure. The formal logician differs from the grammarian only in his greater interest in the types of sentences and transformation rules operative in the language of science. The logician's interest needs to be supplemented by the grammarian's type of interest and by attention to sign combinations and transformations in fields other than science if the whole domain of syntactics is to be adequately explored.

IV. Semantics

7. The Semantical Dimension of Semiosis

Semantics deals with the relation of signs to their designata and so to the objects which they may or do denote. As in the case of the other disciplines dealing with signs, a distinction may be made between its pure and descriptive aspects, pure semantics giving the terms and the theory necessary to talk about the semantical dimension of semiosis, descriptive semantics being concerned with actual instances of this dimension. The latter type of consideration has historically taken precedence over the former; for centuries linguists have been concerned with the study of the conditions under which specific words were employed, philosophical grammarians have tried to find the correlates in nature of linguistic structures and the differentiation of parts of speech, philosophical empiricists have studied in more general terms the conditions under which a sign can be said to have a denotatum (often in order to show that the terms of their metaphysical opponents did not meet these conditions), discussions of the term 'truth' have always involved the question of the relation of signs to things—and yet, in spite of the

length of this history, relatively little has been done in the way of controlled experimentation or in the elaboration of a suitable language to talk about this dimension. The experimental approach made possible by behavioristics offers great promise in determining the actual conditions under which certain signs are employed; the development of the language of semantics has been furthered by recent discussions of the relation of formal linguistic structures to their "interpretations," by attempts (such as those of Carnap and Reichenbach) to formulate more sharply the doctrine of empiricism, and by the efforts of the Polish logicians (notably Tarski) to define formally in a systematic fashion certain terms of central importance within semantics. Nevertheless, semantics has not yet attained a clarity and systematization comparable to that obtained by certain portions of syntactics.

Upon consideration, this situation is not surprising, for a rigorous development of semantics presupposes a relatively highly developed syntactics. To speak of the relation of signs to the objects they designate presupposes, in order to refer both to signs and to objects, the language of syntactics and the thing-language. This reliance upon syntactics is particularly evident in discussing languages, for here a theory of formal linguistic structure is indispensable. For example, the constantly recurring question as to whether the structure of language is the structure of nature cannot properly be discussed until the terms 'structure' and 'structure of a language' are clear; the unsatisfactoriness of historical discussions of this question are certainly in part due to the lack of such preliminary clarification as syntactics has today supplied.

A sign combination such as ' 'Fido' designates *A*' is an instance of a sentence in the language of semantics. Here ' 'Fido' ' denotes 'Fido' (i.e., the sign or the sign vehicle and not a nonlinguistic object), while '*A*' is an indexical sign of some object (it might be the word 'that' used in connection with some directive gesture). ' 'Fido' ' is thus a term in the metalanguage denoting the sign 'Fido' in the object language; '*A*' is a term in the thing-language denoting a thing. 'Designates' is a semanti-

cal term, since it is a characterizing sign designating a relation between a sign and an object. Semantics presupposes syntactics but abstracts from pragmatics; whether dealing with simple signs or complex ones (such as a whole mathematical system), semantics limits itself to the semantical dimension of semiosis.

In considering this dimension, the most important addition to the preceding account lies in the term *'semantical rule.'* Unlike the formation and transformation rules, which deal with certain sign combinations and their relations, 'semantical rule' designates within semiotic a rule which determines under which conditions a sign is applicable to an object or situation; such rules correlate signs and situations denotable by the signs. A sign denotes whatever conforms to the conditions laid down in the semantical rule, while the rule itself states the conditions of designation and so determines the designatum (the class or kind of denotata). The importance of such rules has been stressed by Reichenbach as definitions of co-ordination, and by Ajdukiewicz as empirical rules of meaning; the latter insists that such rules are necessary to characterize uniquely a language, since with different semantical rules two persons might share the same formal linguistic structure and yet be unable to understand each other. Thus, in addition to the syntactical rules, the characterization of a language requires the statement of the semantical rules governing the sign vehicles singly and in combination (it will later become clear that the full semiotical characterization of a language demands in addition the statement of what will be called pragmatical rules).

Rules for the use of sign vehicles are not ordinarily formulated by the users of a language, or are only partially formulated; they exist rather as habits of behavior, so that only certain sign combinations in fact occur, only certain sign combinations are derived from others, and only certain signs are applied to certain situations. The explicit formulation of rules for a given language requires a higher order of symbolization and is a task of descriptive semiotic; it would be a very difficult task to formulate, for instance, the rules of English usage, as may be seen if one even tries to formulate the conditions under which the

words 'this' and 'that' are used. It is natural, therefore, that attention has been chiefly devoted to fragments of the common languages and to languages which have been deliberately constructed.

A sign has a semantical dimension in so far as there are semantical rules (whether formulated or not is irrelevant) which determine its applicability to certain situations under certain conditions. If this usage is stated in terms of other signs, the general formula is as follows: The sign vehicle '*x*' designates the conditions *a*, *b*, *c* . . . . under which it is applicable. The statement of those conditions gives the semantical rule for '*x*.' When any object or situation fulfils the required conditions, then it is denoted by '*x*.' The sign vehicle itself is simply one object, and its denotation of other objects resides solely in the fact that there are rules of usage which correlate the two sets of objects.

The semantical rule for an indexical sign such as pointing is simple: the sign designates at any instant what is pointed at. In general, an indexical sign designates what it directs attention to. An indexical sign does not characterize what it denotes (except to indicate roughly the space-time co-ordinates) and need not be similar to what it denotes. A characterizing sign characterizes that which it can denote. Such a sign may do this by exhibiting in itself the properties an object must have to be denoted by it, and in this case the characterizing sign is an *icon;* if this is not so, the characterizing sign may be called a *symbol.* A photograph, a star chart, a model, a chemical diagram are icons, while the word 'photograph,' the names of the stars and of chemical elements are symbols. A "concept" may be regarded as a semantical rule determining the use of characterizing signs. The semantical rule for the use of icons is that they denote those objects which have the characteristics which they themselves have—or more usually a certain specified set of their characteristics. The semantical rule for the use of symbols must be stated in terms of other symbols whose rules or usages are not in question, or by pointing out specific objects which serve as models (and so as icons), the symbol in question then being employed to denote objects similar to the models.

It is the fact that the semantical rule of usage for a symbol can be stated in terms of other symbols which makes possible (to use Carnap's term) the reduction of one scientific term to others (or, better, the construction of one term upon others) and thus the systematization of the language of science. It is because indexical signs are indispensable (for symbols ultimately involve icons, and icons indices) that such a program of systematization as physicalism proposes is forced to terminate the process of reduction by the acceptance of certain signs as primitive terms whose semantical rules of usage, determining their applicability to things indicated by indices, must be taken for granted but cannot, within that particular systematization, be stated.

The semantical rule for the use of a sentence involves reference to the semantical rules of the component sign vehicles. A sentence is a complex sign to the effect that the designatum of the indexical component is also a designatum of the component which is a characterizing sign. The designatum of a sentence is thus the designatum-of-an-indexical-sign-as-the-designatum-of-a-characterizing-sign; when the situation conforms to the semantical rule of a sentence, the situation is a denotatum of that sentence (and the sentence may then be said to be true of that situation).

The difference between indices, icons, and symbols (sentences being compounds of other signs) is accounted for by different kinds of semantical rules. Things may be regarded as the designata of indexical signs, properties as the designata of one-place characterizing signs, relations as the designata of two- (or more) place characterizing signs, facts or state of affairs as designata of sentences, and entities or beings as the designata of all signs whatsoever.

It is because a sign may have a rule of usage to determine what it can denote without actually being so used that there can be signs which in fact denote nothing or have null denotation. It was previously noted that the very notion of sign involves that of designatum, but not that there be actually existing objects which are denoted. The designatum of a sign is such things which the sign *can* denote, i.e., such objects or situa-

tions which according to the semantical rule of usage could be correlated to the sign vehicle by the semantical relation of denotation. It is now clear, as formerly it could not be, that the *statement* of what would constitute a designatum of a certain sign must itself make use of terms with syntactical relations, since the semantical rule of usage states what the sign in question signifies by using the sign in relation to other signs. 'Designatum' is clearly a semiotical term, while the question as to whether there are objects of such and such a kind is a question to be answered by considerations which go beyond semiotic. The failure to keep separate the statements of semiotic from thing-sentences has led to many pseudo thing-sentences. To say that there is a "realm of subsistence" in addition to, but on a par with, the realm of existences, since "When we think, we must think about something," is a quasi-semantical statement: it seems to speak about the world in the same way that physics does, but actually the statement is an ambiguous form of a semantical sentence, namely, the sentence that for every sign that can denote something a semantical rule of usage can be formulated which will state the conditions under which the sign is applicable. This statement, analytically correct within semantics, does not in any sense imply that there are objects denoted by every such sign—objects which are "subsistential" when not existential.

8. Linguistic and Nonlinguistic Structures

One of the oldest and most persistent theories is that languages mirror (correspond with, reflect, are isomorphic with) the realm of nonlinguistic objects. In the classical tradition it was often held that this mirroring was threefold: thought reflected the properties of objects; and spoken language, composed of sounds which had been given a representative function by mind, in turn reflected the kinds and relations of mental phenomena and so the realm of nonmental objects.

It goes without saying that such a persistent tradition as lies behind the doctrine in question must have something to commend it; it is, nevertheless, significant that this tradition has

progressively weakened and has even been repudiated by some of its most vigorous former champions. What light can the general semiotical point of view throw on the situation? In attempting to answer this question, it will be seen that the heart of the matter lies in the fact that the only relevant correlation which exists between signs and other objects is that established by semantical rules.

It seems plausible that the excesses and difficulties of the attempt to find a complete semantical correlation between linguistic signs and other objects lies in the neglect or oversimplification of the syntactical and pragmatical dimensions of semiosis. It has been noted that the very possibility of language requires that there be some special signs to indicate the syntactical relations of other signs in the language. Examples of such signs are pauses, intonations, order of signs, prepositions, affixes, suffixes, etc. Such signs function predominantly in the syntactical and pragmatical dimensions; in so far as they have a semantical dimension, they denote sign vehicles and not nonlinguistic objects. It need not be denied that such signs might help to establish some kind of isomorphism between the remaining signs and nonlinguistic objects, for such isomorphism might be much more complicated than the relation of a model to that of which it is a model. Spatial relations of signs might not correspond to spatial relations between things, but there might be a correlating relation such that for every spatial relation between signs there holds some other relation between the objects denoted by the signs. Such possibilities are open to investigation and should be specifically explored; if they do not hold for all signs, they may hold for certain of them, namely, for such as have semantical rules correlating them with nonlinguistic situations. Nevertheless, the defenders of isomorphism have not shown that such is the case, or that such must be the case if language is to be possible.

The unconvincingness of the general theory increases if notice is taken of such signs as 'all,' 'some,' 'the,' 'not,' 'point at infinity,' '-1.' The first three terms indicate how much of the class determined by some characterizing sign is to be taken ac-

count of. The term 'not' is primarily of practical importance, since it allows reference to something other than what is specifically referred to without specifying what the other is. So clarified semantically, the practical importance of the term is obvious, but it is not theoretically necessary in a language, and certainly no existential "negative facts" need be invoked to correspond to it. The mathematical terms mentioned are commonly regarded as signs added to the language so that certain operations, otherwise impossible in certain cases, are always possible, and certain formulas, otherwise needing qualification, can be stated in their full generality.

There are also many signs in a common language which indicate the reaction of the user of the signs to the situation being described (as the 'fortunately' in 'Fortunately, he came'), or even to the signs he is himself using in the description (as in expressing his degree of confidence in a statement). Such terms within discourse have a semantical dimension only at a higher level of semiosis, since the pragmatical dimension of a process of semiosis is not denoted in that process but only in one of a higher level. As in the case of the predominantly syntactical features of a language, the predominantly pragmatical features should not be confounded with those elements correlated by means of semantical rules with the nonlinguistic objects which are being denoted. The traditional versions of isomorphism failed to distinguish the various dimensions of semiosis and the various levels of languages and designata. To what extent some qualified version of the thesis may be held can only be determined after it is formulated. But it is clear that, when a language as a whole is considered, its syntactical structure is a function of both pragmatic and empirical considerations and is not a bare mirroring of nature considered in abstraction from the users of the language.

The main point of the discussion is not to deny that all the signs in a language may have designata and so a semantical dimension but rather to call attention to the fact that the designata of signs in a given discourse (and so the objects denoted, if there are such) do not stand at the same level: the

designata of some signs must be sought at the level of semiotic rather than at the level of the thing-language itself; in the given discourse such signs simply indicate (but do not designate) relations of the other signs to one another or to the interpreter—in Scholastic terms they bring something of material and simple supposition into the functioning of terms in personal supposition. The strata of signs are as complex and as difficult to unravel as geological strata; the scientific and psychological effects of unraveling them may be as great in the former case as it has been in the latter.

So much for a bare indication of the field of semantics. The precise analysis of semantical terms, their formal systematization, and the question of the applicability of semantics to domains other than the language of science (for instance, to aesthetic signs) obviously are not possible in an introductory account. If pragmatical factors have appeared frequently in pages belonging to semantics, it is because the current recognition that syntactics must be supplemented by semantics has not been so commonly extended to the recognition that semantics must in turn be supplemented by pragmatics. It is true that syntactics and semantics, singly and jointly, are capable of a relatively high degree of autonomy. But syntactical and semantical rules are only the verbal formulations within semiotic of what in any concrete case of semiosis are habits of sign usage by actual users of signs. 'Rules of sign usage,' like 'sign' itself, is a semiotical term and cannot be stated syntactically or semantically.

V. Pragmatics

9. The Pragmatical Dimension of Semiosis

The term 'pragmatics' has obviously been coined with reference to the term 'pragmatism.' It is a plausible view that the permanent significance of pragmatism lies in the fact that it has directed attention more closely to the relation of signs to their users than had previously been done and has assessed more profoundly than ever before the relevance of this relation in understanding intellectual activities. The term 'pragmatics' helps to

signalize the significance of the achievements of Peirce, James, Dewey, and Mead within the field of semiotic. At the same time, 'pragmatics' as a specifically semiotical term must receive its own formulation. By 'pragmatics' is designated the science of the relation of signs to their interpreters. 'Pragmatics' must then be distinguished from 'pragmatism,' and 'pragmatical' from 'pragmatic.' Since most, if not all, signs have as their interpreters living organisms, it is a sufficiently accurate characterization of pragmatics to say that 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. Pragmatics, too, has its pure and descriptive aspects; the first arises out of the attempt to develop a language in which to talk about the pragmatical dimension of semiosis; the latter is concerned with the application of this language to specific cases.

Historically, rhetoric may be regarded as an early and restricted form of pragmatics, and the pragmatical aspect of science has been a recurrent theme among the expositors and interpreters of experimental science. Reference to interpreter and interpretation is common in the classical definition of signs. Aristotle, in the *De interpretatione*, speaks of words as conventional signs of thoughts which all men have in common. His words contain the basis of the theory which became traditional: The interpreter of the sign is the mind; the interpretant is a thought or concept; these thoughts or concepts are common to all men and arise from the apprehension by mind of objects and their properties; uttered words are then given by the mind the function of directly representing these concepts and indirectly the corresponding things; the sounds chosen for this purpose are arbitrary and vary from social group to social group; the relations between the sounds are not arbitrary but correspond to the relations of concepts and so of things. In this way throughout much of its history the theory of signs was linked with a particular theory of thought and mind, so much so that logic, which has always been affected by current theories of signs, was often conceived as dealing with concepts—a view made precise in the

Scholastic doctrine of logical terms as terms of second intention. Even Leibniz' insistence upon the empirical study of the sign vehicle as determined by rule was not a repudiation of the dominant tradition but merely an insistence that in this way a new and better technique could be obtained for analyzing concepts than by the attempt to inspect thought directly.

In the course of time most of the tenets of this traditional version of pragmatics were questioned, and today they would be accepted only with serious qualifications. The change in point of view has been most rapid as a result of the implications for psychology of the Darwinian biology—implications which received an early interpretation in pragmatism. Charles S. Peirce, whose work is second to none in the history of semiotic, came to the conclusion that in the end the interpretant of a symbol must reside in a habit and not in the immediate physiological reaction which the sign vehicle evoked or in the attendant images or emotions—a doctrine which prepared the way for the contemporary emphasis on rules of usage. William James stressed the view that a concept was not an entity but a way in which certain perceptual data functioned representatively and that such "mental" functioning, instead of being a bare contemplation of the world, is a highly selective process in which the organism gets indications as to how to act with reference to the world in order to satisfy its needs or interests. George H. Mead was especially concerned with the behavior involved in the functioning of linguistic signs and with the social context in which such signs arise and function. His work is the most important study from the point of view of pragmatism of these aspects of semiosis. John Dewey's instrumentalism is the generalized version of the pragmatists' emphasis upon the instrumental functioning of signs or "ideas."

If from pragmatism is abstracted the features of particular interest to pragmatics, the result may be formulated somewhat as follows: The interpreter of a sign is an organism; the interpretant is the habit of the organism to respond, because of the sign vehicle, to absent objects which are relevant to a present problematic situation as if they were present. In virtue of

semiosis an organism takes account of relevant properties of absent objects, or unobserved properties of objects which are present, and in this lies the general instrumental significance of ideas. Given the sign vehicle as an object of response, the organism expects a situation of such and such a kind and, on the basis of this expectation, can partially prepare itself in advance for what may develop. The response to things through the intermediacy of signs is thus biologically a continuation of the same process in which the distance senses have taken precedence over the contact senses in the control of conduct in higher animal forms; such animals through sight, hearing, and smell are already responding to distant parts of the environment through certain properties of objects functioning as signs of other properties. This process of taking account of a constantly more remote environment is simply continued in the complex processes of semiosis made possible by language, the object taken account of no longer needing to be perceptually present.

With this orientation, certain of the terms which have previously been used appear in a new light. The relation of a sign vehicle to its designatum is the actual taking-account in the conduct of the interpreter of a class of things in virtue of the response to the sign vehicle, and what are so taken account of are designata. The semantical rule has as its correlate in the pragmatical dimension 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. The formation and transformation rules correspond to the actual sign combinations and transitions which the interpreter uses, or to stipulations for the use of signs which he lays down for himself in the same way in which he attempts to control deliberately other modes of behavior with reference to persons and things. Considered from the point of view of pragmatics, a linguistic structure is a system of behavior: corresponding to analytical sentences are the relations between sign responses to the more inclusive sign responses of which they are segments; corresponding to synthetical sentences are those relations between

sign responses which are not relations of part to whole. The indexical signs (or their substitutes) in a sign combination direct the attention of the interpreter to parts of the environment; the dominant characterizing sign determines some general response (expectation) to these parts; the characterizing specifiers delimit the general expectation, the degree of specification and the choice of the dominant sign being determined with respect to the problem at hand. If the indexical and characterizing functions are both performed, the interpreter is judging and the sign combination is a judgment (corresponding to the sentence of syntactics and the statement or proposition of semantics). To the degree that what is expected is found as expected the sign is confirmed; expectations are, in general, only partially confirmed; there may be, in addition, various degrees of indirect confirmation that what is indexically referred to has the properties it was expected to have. In general, from the point of view of behavior, signs are "true" in so far as they correctly determine the expectations of their users, and so release more fully the behavior which is implicitly aroused in the expectation or interpretation.

Such statements go somewhat beyond pragmatics proper into the strictly semiotical question as to the interrelation of the dimensions—a topic yet to be specifically discussed. Pragmatics itself would attempt to develop terms appropriate to the study of the relation of signs to their users and to order systematically the results which come from the study of this dimension of semiosis. Such terms as 'interpreter,' 'interpretant,' 'convention' (when applied to signs), 'taking-account-of' (when a function of signs), 'verification,' and 'understands' are terms of pragmatics, while many strictly semiotical terms such as 'sign,' 'language,' 'truth,' and 'knowledge' have important pragmatical components. In a systematic presentation of semiotic, pragmatics presupposes both syntactics and semantics, as the latter in turn presupposes the former, for to discuss adequately the relation of signs to their interpreters requires knowledge of the relation of signs to one another and to those things to which they refer their interpreters. The unique elements within prag-

matics would be found in those terms which, while not strictly semiotical, cannot be defined in syntactics or semantics; in the clarification of the pragmatical aspect of various semiotical terms; and in the statement of what psychologically, biologically, and sociologically is involved in the occurrence of signs. Attention may now be turned to some aspects of this latter problem.

10. Individual and Social Factors in Semiosis

The topic in question may be approached, and a possible objection forestalled, by asking why there is any need of adding pragmatics to semantics; since semantics deals with the relation of signs to objects, and since interpreters and their responses are natural objects studied by the empirical sciences, it would seem as if the relation of signs to interpreters fell within semantics. The confusion here arises from the failure to distinguish levels of symbolization and to separate—in the use of 'object'—semiotical from nonsemiotical terms. Everything that is designatable is subject matter for a (in principle) unified science, and in this sense all the semiotical sciences are parts of unified science. When descriptive statements are made about any dimension of semiosis, the statements are in the semantical dimension of a higher level of semiosis and so are not necessarily of the same dimension that is being studied. Statements in pragmatics about the pragmatical dimension of specific signs are functioning predominantly in the semantical dimension. The fact that the pragmatical dimension becomes a designatum for a higher-level process of description does not signify that the interpretant of a sign at any given level is a designatum of that particular sign. The interpretant of a sign is the habit in virtue of which the sign vehicle can be said to designate certain kinds of objects or situations; as the method of determining the set of objects the sign in question designates, it is not itself a member of that set. Even the language of a unified science which would contain an account of the pragmatical dimension would not at the moment of use denote its own pragmatical dimension, though at a higher level of usage the account given of the

pragmatical dimension may be found applicable to the pragmatical dimension of the lower level. Since the pragmatical dimension is involved in the very existence of the relation of designation, it cannot itself be put within the semantical dimension. Semantics does not deal with all the relations of signs to objects but, as a semiotical science, deals with the relation of signs to their designata; pragmatics, dealing with another relation of signs, cannot be put within semantics alone or in combination with syntactics. This conclusion is completely independent of the relation of physical and biological existences; the distinction of the semantical and pragmatical dimensions is a semiotical distinction and has nothing to do with the relation of biology and physics.

The point can perhaps be made sharper if we introduce the term '*pragmatical rule*.' Syntactical rules determine the sign relations between sign vehicles; semantical rules correlate sign vehicles with other objects; pragmatical rules state the conditions in the interpreters under which the sign vehicle is a sign. Any rule when actually in use operates as a type of behavior, and in this sense there is a pragmatical component in all rules. But in some languages there are sign vehicles governed by rules over and above any syntactical or semantical rules which may govern those sign vehicles, and such rules are pragmatical rules. Interjections such as 'Oh!,' commands such as 'Come here!,' value terms such as 'fortunately,' expressions such as 'Good morning!,' and various rhetorical and poetical devices occur only under certain definite conditions in the users of the language; they may be said to express such conditions, but they do not denote them at the level of semiosis in which they are actually employed in common discourse. The statement of the conditions under which terms are used, in so far as these cannot be formulated in terms of syntactical and semantical rules, constitutes the pragmatical rules for the terms in question.

The full characterization of a language may now be given: *A language in the full semiotical sense of the term is any intersubjective set of sign vehicles whose usage is determined by syntactical, semantical, and pragmatical rules.*

Interpretation becomes especially complex, and the individual and social results especially important, in the case of linguistic signs. In terms of pragmatics, a linguistic sign is used in combination with other signs by the members of a social group; a language is a social system of signs mediating the responses of members of a community to one another and to their environment. To understand a language is to employ only those sign combinations and transformations not prohibited by the usages of the social group in question, to denote objects and situations as do the members of this group, to have the expectations which the others have when certain sign vehicles are employed, and to express one's own states as others do—in short, to understand a language or to use it correctly is to follow the rules of usage (syntactical, semantical, and pragmatical) current in the given social community.

There is a further stipulation often made in connection with the linguistic sign: it must be capable of voluntary use for the function of communicating. Such terms as 'voluntary' and 'communication' need more extended analysis than is here possible, but Mead's account, in *Mind, Self, and Society*, of the linguistic sign (which he calls the significant symbol) seems to cover the point intended in this stipulation. According to Mead, the primary phenomenon out of which language in the full human sense emerges is the gesture, especially the vocal gesture. The gesture sign (such as a dog's snarl) differs from such a nongestural sign as thunder in the fact that the sign vehicle is an early phase of a social act and the designatum a later phase of this act (in this case the attack by the dog). Here one organism prepares itself for what another organism—the dog—is to do by responding to certain acts of the latter organism as signs; in the case in question the snarl is the sign, the attack is the designatum, the animal being attacked is the interpreter, and the preparatory response of the interpreter is the interpretant. The utility of such gesture signs is limited by the fact that the sign is not a sign to the producer as it is to the receiver: the dog which snarls does not respond to his snarl as

does his opponent; the sign is not held in common and so is not a linguistic sign.

On the other hand, the important characteristic of the vocal gesture lies precisely in the fact that the emitter of the sound himself hears the sound just as others do. When such sounds become connected with social acts (such as a fight, a game, a festival), the various participants in the act have through this common sign, and in spite of their differentiated functions within the act, a common designatum. Each participant in the common activity stimulates himself by his vocal gestures as he stimulates others. Couple this with what Mead termed the temporal dimension of the nervous system (namely, an earlier but more slowly aroused activity may initiate a later and more rapid activity which in turn furthers or checks the complete arousal of the first activity), and one obtains a possible explanation of how linguistic signs serve for voluntary communication. To use one of Mead's frequent examples, we may consider the situation of a person noticing smoke in a crowded theater. Smoke is a nongestural sign of fire, and its perception calls out to some degree responses appropriate to fire. But further, the spoken word 'fire,' as a response which is connected with a whole set of responses to fire, tends to be uttered. Since this is a linguistic sign, the utterer begins to respond toward this tendency toward utterance as other members of his social group would respond—to run toward an exit, to push, and perhaps trample over, others blocking the way, etc. But the individual, in virtue of certain fundamental attitudes, will respond either favorably or unfavorably to these tendencies and will thus check or further the tendency to say 'Fire!'

In such a case it is said that the man "knew what he was about," that he "deliberately used (or did not use) a certain sign to communicate to others," that he "took account of others." Mead would generalize from such common usages: from his point of view "to have a mind" or "to be conscious of something" was equivalent to "using linguistic signs." It is through such signs that the individual is able to act in the light of consequences to himself and to others, and so to gain a certain

amount of control over his own behavior; the presentation of possible consequences of action through the production of linguistic signs becomes a factor in the release or inhibition of the action which has (or seems to have) such consequences. It is in such processes that the term 'choice' gains its clarification—and also whatever distinction is to be made between senders and receivers of linguistic signs. Since the linguistic sign is socially conditioned, Mead, from the standpoint of his social behaviorism, regarded the individual mind and self-conscious self as appearing in a social process when objective gestural communication becomes internalized in the individual through the functioning of vocal gestures. Thus it is through the achievements of the community, made available to the individual by his participation in the common language, that the individual is able to gain a self and mind and to utilize those achievements in the furtherance of his interests. The community benefits at the same time in that its members are now able to control their behavior in the light of the consequences of this behavior to others and to make available to the whole community their own experiences and achievements. At these complex levels of semiosis, the sign reveals itself as the main agency in the development of individual freedom and social integration.

11. Pragmatic Use and Abuse of Signs

When a sign produced or used by an interpreter is employed as a means of gaining information about the interpreter, the point of view taken is that of a higher process of semiosis, namely, that of descriptive pragmatics. Psychoanalysis among the psychologies, pragmatism among the philosophies, and now the sociology of knowledge among the social sciences have made this way of looking at signs a common possession of educated persons. Newspaper statements, political creeds, and philosophical systems are increasingly being looked at in terms of the interests which are expressed and served by the production and use of the signs in question. The psychoanalyist is interested in dreams for the light they throw upon the dreamer; the sociologist of knowledge is interested in the social conditions under

which doctrines and systems of doctrine are current. In neither case is the interest in the question whether the dreams or doctrines are true in the semantical sense of the term, i.e., whether there are situations which the dreams and the doctrines may be said to denote. Such studies, together with many others, have confirmed over a wide range the general thesis of pragmatism as to the instrumental character of ideas.

Any sign whatever may be looked at in terms of the psychological, biological, and sociological conditions of its usage. The sign expresses but does not denote its own interpretant; only at a higher level is the relation of the sign to the interpreter itself made a matter for designation. When this is done and a correlation found, the sign becomes of individual and social diagnostic value, and so a new sign at a higher level of semiosis. Signs as well as things not signs can become diagnostic signs: the fact that a patient has a fever shows certain things about his condition; equally well the fact that a certain sign is used by someone expresses that person's condition, for the interpretant of the sign is part of the conduct of the individual. In such cases the same sign vehicle may be functioning as two signs, interpreted by the patient as referring to its denotata and by the diagnostician as referring to the interpretant involved in the patient's sign.

Not only may all signs be regarded in terms of pragmatics, but it is also perfectly legitimate for certain purposes to use signs simply in order to produce certain processes of interpretation, regardless of whether there are objects denoted by the signs or even whether the sign combinations are formally possible in terms of the formation and transformation rules of the language in which the sign vehicles in question are normally used. Some logicians seem to have a generalized fear of contradictions, forgetting that, while contradictions frustrate the normal uses of deduction, they may be perfectly compatible with other interests. Even linguistic signs have many other uses than that of communicating confirmable propositions: they may be used in many ways to control the behavior of one's self or of other users of the sign by the production of certain inter-

pretants. Commands, questions, entreaties, and exhortations are of this sort, and to a large degree the signs used in the literary, pictorial, and plastic arts. For aesthetic and practical purposes the effective use of signs may require rather extensive variations from the use of the same sign vehicles most effective for the purposes of science. Scientists and logicians may be excused if they judge signs in terms of their own purposes, but the semiotician must be interested in all the dimensions and all the uses of signs; the syntactics, semantics, and pragmatics of the signs used in literature, the arts, morality, religion, and in value judgments generally are as much his concern as studies of the signs used in science. In one case as in the other the usage of the sign vehicle varies with the purpose to be served.

If semiotic must defend the legitimacy for certain purposes of a concern for the effect of the sign on those who will interpret it, it must equally set itself the task of unmasking confusion of these various purposes which signs serve, whether the confusion be unintentional or deliberate. Just as properly syntactical or semantical statements may masquerade in a form which causes them to appear as statements about nonlinguistic objects, so may pragmatical statements thus masquerade; they then become, as quasi-pragmatical statements, one particular form of pseudo thing-sentences. In the clearly dishonest cases a purpose is accomplished by giving the signs employed the characteristics of statements with syntactical or semantical dimensions, so that they seem to be rationally demonstrated or empirically supported when in fact they are neither. An intellectual intuition, superior to scientific method, may be invoked to bolster up the validity of what is apparently affirmed. The masquerading may not be of one dimension in terms of others but within the pragmatical dimension itself; a purpose that cannot fully stand the light of scrutiny expresses itself in a form suitable to other purposes: aggressive acts of individuals and social groups often drape themselves in the mantle of morality, and the declared purpose is often not the real one. A peculiarly intellectualistic justification of dishonesty in the use of signs is to deny that truth has any other component than the pragmatical, so that

any sign which furthers the interest of the user is said to be true. In terms of the preceding analysis it should be clear that 'truth' as commonly used is a semiotical term and cannot be used in terms of any one dimension unless this usage is explicitly adopted. Those who like to believe that 'truth' is a strictly pragmatical term often refer to the pragmatists in support of their view and naturally fail to note (or to state) that pragmatism as a continuation of empiricism is a generalization of scientific method for philosophical purposes and could not hold that the factors in the common usage of the term 'truth' to which attention was being drawn rendered nonexistent previously recognized factors. Certain of James's statements taken in isolation might seem to justify this perversion of pragmatism, but no one can seriously study James without seeing that his doctrine of truth was in principle semiotical: he clearly recognized the need of bringing in formal, empirical, and pragmatic factors; his main difficulty was in integrating these factors, since he lacked the base which a developed theory of signs provides. Dewey has specifically denied the imputed identification of truth and utility. Pragmatism has insisted upon the pragmatical and pragmatic aspects of truth; the perversion of this doctrine into the view that truth has only such aspects is an interesting case of how the results of a scientific analysis may be distorted to lend credibility to quasi-pragmatical statements.

Pseudo thing-sentences of the quasi-pragmatical type are not for the most part deliberate deception of others by the use of signs but cases of unconscious self-deception. Thus a philosopher with certain imperious needs may from a relatively small empirical base construct an elaborate sign system, perhaps in mathematical form, and yet the great majority of terms may be without semantical rules of usage; the impression that the system is about the world, and perhaps superior in truth to science, comes from the confusion of analytic and synthetic sentences and from the illusion that the congenial attitudes evoked by the signs constitute semantical rules. A somewhat similar manifestation is found in mythology, but without the evident influence of scientific types of expression.

A particularly interesting aberration of the semiotical processes takes place in certain phenomena studied by psychopathology. Signs normally take the place of objects they designate only to a limited extent; but if for various reasons interests cannot be satisfied in the objects themselves, the signs come more and more to take the place of the object. In the aesthetic sign this development is already evident, but the interpreter does not actually confuse the sign with the object it designates: the described or painted man is called a man, to be sure, but with more or less clear recognition of the sign status—it is only a painted or described man. In the magical use of signs the distinction is less clearly made; operations on the sign vehicle take the place of operations on the more elusive object. In certain kinds of insanity the distinction between the designatum and denotata vanishes; the troublesome world of existences is pushed aside, and the frustrated interests get what satisfaction they can in the domain of signs, oblivious in varying degrees to the restrictions of consistency and verifiability imposed by the syntactical and semantical dimensions. The field of psychopathology offers great opportunities for applications of, and contributions to, semiotic. A number of workers in this field have already recognized the key place which the concept of sign holds. If, following the lead of the pragmatist, mental phenomena be equated with sign responses, consciousness with reference by signs, and rational (or "free") behavior with the control of conduct in terms of foreseen consequences made available by signs, then psychology and the social sciences may recognize what is distinctive in their tasks and at the same time see their place within a unified science. Indeed, it does not seem fantastic to believe that the concept of sign may prove as fundamental to the sciences of man as the concept of atom has been for the physical sciences or the concept of cell for the biological sciences.

VI. The Unity of Semiotic

12. Meaning

We have been studying certain features of the phenomenon of sign-functioning by making use of the abstractions involved in distinguishing syntactics, semantics, and pragmatics—just as biologists study anatomy, ecology, and physiology. While we have recognized explicitly the abstractions involved and have constantly correlated the three subdisciplines of semiotic, we must now draw even more explicitly the unity of semiotic into the focus of attention.

In a wide sense, any term of syntactics, semantics, or pragmatics is a semiotical term; in a narrow sense, only those terms are semiotical which cannot be defined in any of the component fields alone. In the strict sense 'sign,' 'language,' 'semiotic,' 'semiosis,' 'syntactics,' 'truth,' 'knowledge,' etc., are semiotical terms. What of the term 'meaning'? In the preceding discussion the term 'meaning' has been deliberately avoided. In general it is well to avoid this term in discussions of signs; theoretically, it can be dispensed with entirely and should not be incorporated into the language of semiotic. But since the term has had such a notorious history, and since in its consideration certain important implications of the present account can be made clear, the present section is devoted to its discussion.

The confusion regarding the "meaning of 'meaning' " lies in part in the failure to distinguish with sufficient clarity the dimension of semiosis which is under consideration, a situation which also obtains in the confusions as to the terms 'truth' and 'logic.' In some cases 'meaning' refers to designata, in other cases to denotata, at times to the interpretant, in some cases to what a sign implicates, in some usages to the process of semiosis as such, and often to significance or value. Similar confusions are found in the common usages of 'designates,' 'signifies,' 'indicates,' 'expresses,' and in various attempts by linguists to define such terms as 'sentence,' 'word,' and 'part of speech.' The most charitable interpretation of such confusions is to suggest that for the major purposes which the everyday languages serve it

has not been necessary to denote with precision the various factors in semiosis—the process is merely referred to in a vague way by the term 'meaning.' When, however, such vague usages are taken over into domains where an understanding of semiosis is important, then confusion results. It then becomes necessary to either abandon the term 'meaning' or to devise ways to make clear the usage in question. Semiotic does not rest upon a theory of "meaning"; the term 'meaning' is rather to be clarified in terms of semiotic.

Another factor in the confusion is a psychological-linguistic one: men in general find it difficult to think clearly about complex functional and relational processes, a situation reflected in the prevalence of certain linguistic forms. Action centers around handling things with properties, and the fact that these things and properties appear only in complex contexts is a much later and more difficult realization. Hence the naturalness of what Whitehead has called the fallacy of simple location. In the present case this takes the form of looking for meanings as one would look for marbles: a meaning is considered as one thing among other things, a definite something definitely located somewhere. This may be sought for in the designatum, which thus becomes transformed in certain varieties of "realism" into a special kind of object—a "Platonic idea" inhabiting the "realm of subsistence," perhaps grasped by a special faculty for intuiting "essences"; or it may be sought for in the interpretant, which then becomes transformed in conceptualism into a concept or idea inhabiting a special domain of mental entities whose relation to the "psychical states" of individual interpreters becomes very difficult to state; or in desperation caused by contemplation of the previous alternatives it may be sought in the sign vehicle—though historically few if any "nominalists" have held this position. As a matter of fact, none of these positions has proved satisfactory and none of them is demanded. As semiotical terms, neither 'sign vehicle,' 'designatum,' nor 'interpretant' can be defined without reference to one another; hence they do not stand for isolated existences but for things or properties of things in certain specifiable func-

tional relations to other things or properties. A "psychical state," or even a response, is not as such an interpretant but becomes such only in so far as it is a "taking-account-of-something" evoked by a sign vehicle. No object is as such a denotatum but becomes one in so far as it is a member of the class of objects designatable by some sign vehicle in virtue of the semantical rule for that sign vehicle. Nothing is intrinsically a sign or a sign vehicle but becomes such only in so far as it permits something to take account of something through its mediation. Meanings are not to be located as existences at any place in the process of semiosis but are to be characterized in terms of this process as a whole. 'Meaning' is a semiotical term and not a term in the thing-language; to say that there are meanings in nature is not to affirm that there is class of entities on a par with trees, rocks, organisms, and colors, but that such objects and properties function within processes of semiosis.

This formulation also avoids another persistent stumbling block, namely, the belief that meaning is in principle personal, private, or subjective. Such a view historically owes much to the assimilation of the conceptualistic position within an associational psychology which itself uncritically accepted the current metaphysical view of the subjectivity of experience. Persons such as Ockham and Locke were well aware of the importance of habit in the functioning of signs, but as the associational psychology came more and more to reduce mental phenomena to combinations of "psychical states," and to conceive these states as within the individual's "mind" and only accessible to that mind, meaning itself came to be considered in the same terms. Meanings were inaccessible to observation from without, but individuals somehow managed to communicate these private mental states by the use of sounds, writing, and other signs.

The notion of the subjectivity of experience cannot be here analyzed with the detail the problem merits. It is believed, however, that such an analysis would show that 'experience' itself is a relational term masquerading as a thing-name. x is an experience if and only if there is some y (the experiencer) which

stands in the experience relation to x. If E is an abbreviation for 'experience relation,' then the class of y's such that y stands in the relation of E to something or other is the class of *experiencers*, and the x's to which something or other stands in the relation E constitute the class of *experiences*. An experience is not, then, a special class of objects on a par with other objects, but objects in a certain relation. The relation E will not here be exhaustively characterized (that is a central task for empiricism), but as a first approximation it can be said that to experience something is to take account of its properties by appropriate conduct; the experience is *direct* to the degree that this is done by direct response to the something in question, and *indirect* to the degree that it is done through the intermediacy of signs. For y_1 to experience x_1 it is sufficient that y_1Ex_1 holds; there is *conscious experience* if y_1Ex_1 is an experience (e.g., if $y_1E[y_1Ex_1]$ holds), otherwise the experience is *unconscious*. An experience x_1 is *de facto subjective* with respect to y_1 if y_1 is the only one who stands in the relation E to x_1; an experience x_1 is *intrinsically subjective* with respect to y_1, relative to a certain state of knowledge, if the known laws of nature permit the deduction that no other y can stand in this relation to x_1. An experience is *de facto intersubjective* if it is not *de facto* subjective, and it is *potentially intersubjective* if it is not intrinsically subjective. It should be noted that with such usages a person may not be able directly to experience aspects of himself that others can directly experience, so that the line between subjective and intersubjective experience in no sense coincides with the distinction between experiencers and external objects.

What bearing does this (tentative and preliminary) analysis have on the question of meaning? It may be admitted, if the facts warrant it, that there are certain experiences which are *de facto* subjective as far as direct experience is concerned and that this may even be true of the direct experience of the process of semiosis; there would be nothing surprising in the conclusion that, if I am the interpreter of a particular sign, there are then aspects of the process of interpretation which I can directly experience but which others cannot. The important point is that

such a conclusion would not be in opposition to the thesis of *the potential intersubjectivity of every meaning.* The fact that y_1 and y_2 do not stand in the relation of direct experience to each other's respective direct experience of x_1 does not prevent them both from directly experiencing x_1, or from indirectly designating (and so indirectly experiencing) by the use of signs the experience relations in which the other stands—for under certain circumstances an object which cannot be directly experienced can, nevertheless, be denoted. Applying this result to the case of a particular sign, y_1 and y_2 may differ in their direct experience of the meaning situation and yet have the same meaning in common and, in general, be able to decide what the other means by a particular sign and the degree to which the two meanings are the same or different. For the determination of the meaning of S_1 (where S_1 is a sign vehicle) to y_1 it is not necessary that an investigator become y_1 or have his experiences of S_1: it is sufficient to determine how S_1 is related to other signs used by y_1, under what situations y_1 uses S_1 for purposes of designation, and what expectations y_1 has when he responds to S_1. To the degree that the same relations hold for y_2 as for y_1, then S_1 has the same meaning to y_1 and y_2; to the degree that the relations in question differ for y_1 and y_2, then S_1 has a different meaning.

In short, since the meaning of a sign is exhaustively specified by the ascertainment of its rules of usage, the meaning of any sign is in principle exhaustively determinable by objective investigation. Since it is then possible, if it seems wise, to standardize this usage, the result is that the meaning of every sign is potentially intersubjective. Even where the sign vehicle is intrinsically subjective there can be indirect confirmation that there is such a sign vehicle with such and such meaning. It is true that in practice the determination of meaning is difficult and that the differences in sign usages among persons of even the same social group may be rather great. But it is theoretically important to realize that the subjectivity of certain experiences, and even experiences of semiosis, is compatible with the

possibility of an objective and exhaustive determination of any meaning whatsoever.

Having introduced the term 'meaning' only provisionally in order to bring out the implications of the position here taken, the use of the term will now be discontinued—it adds nothing to the set of semiotical terms. It may be pointed out that the preceding argument shows the agreement of what will be called *sign analysis* with the requirements of scientific investigation. Sign analysis is the determination of the syntactical, semantical, and pragmatical dimensions of specific processes of semiosis; it is the determination of the rules of usage of given sign vehicles. Logical analysis is, in the widest sense of the term 'logic,' identical with sign analysis; in narrower usages, logical analysis is some part of sign analysis, such as the study of the syntactical relations of the sign vehicle in question. Sign analysis (i.e., descriptive semiotic) can be carried on in accordance with all recognized principles of scientific procedure.

13. Universals and Universality

Certain aspects of the "universality" (or generality) of signs have long attracted attention, and their explanation has been a source of many philosophical disputes. By viewing the phenomena vaguely referred to under the overworked terms 'universals' and 'universality' through the prism of semiotical analysis, the various components of the problems may be separated and their relations seen.

The subject may be approached in terms of Peirce's distinction between a *sinsign* and a *legisign:* a sinsign is a particular something functioning as a sign, while a legisign is a "law" functioning as a sign. A particular series of marks at a specific place, such as 'house,' is a sinsign; such a specific set of marks is not, however, the English word *house*, for this word is "one," while its instances or replicas are as numerous as the various employments of the word. It is a law or habit of usage, a "universal" as over against its particular instances. Peirce was very much impressed by this situation and made the difference basic in his classification of signs; it gave an instance in the domain

of signs of the phenomena of law (habit, Thirdness, mediation) upon whose objectivity Peirce was so insistent.

The account which has here been given is compatible with this general emphasis; the preceding section should have made clear that semiosis, as a functional process, is just as real and objective as are the component factors which function in the process. It must also be admitted that in a given instance of semiosis in which, say, 'house' functions as a sign vehicle, this sinsign or this particular instance of semiosis is not identical with the legisign *house*. What, then, is a legisign and where in semiosis are "universals" and "universality" to be found? In general, the answer must be that there is an element of universality or generality in all the dimensions and that confusion results here as elsewhere when these are not distinguished and when statements in the metalanguage are confounded with statements in the thing-language.

It is experimentally confirmable that in a given process of semiosis various sign vehicles may be substituted for the original sign vehicle without the occurrence of any relevant change in the remainder of the process. The metronome beat to which an animal is conditioned may move faster or slower within certain limits without the response of the animal undergoing change; the spoken word 'house' may be uttered at different times by the same or different persons, with various tonal changes, and yet will awaken the same response and be used to designate the same objects. If the word is written, the sizes may vary greatly, the letters may differ in style, the media used may be of various colors. The question of the limits of such variation and what remains constant within this range is in a given case very difficult to determine even by the use of the most careful experimental techniques, but of the fact of variability there is no doubt possible. Strictly speaking, the sign vehicle is only that aspect of the apparent sign vehicle in virtue of which semiosis takes place; the rest is semiotically irrelevant. To say that a given sign vehicle is "universal" (or general) is merely to say that it is one of a class of objects which have the property or properties necessary to arouse certain expectations, to combine

in specified ways with other sign vehicles, and to denote certain objects, i.e., that it is one member of a class of objects all of which are subject to the same rules of sign usage. Thus 'house' and 'HOUSE' may be the same sign vehicles, but 'house' and 'Haus' are not; the fact that 'the house is red' conforms to the rules of English while 'the Haus is red' does not, shows that the sign vehicles are not the same, since the rules of usage are (in part) different. None of the disciplines concerned with signs is interested in the complete physical description of the sign vehicle but is concerned with the sign vehicle only in so far as it conforms to rules of usage.

In any specific case of semiosis the sign vehicle is, of course, a definite particular, a sinsign; its "universality," its being a legisign, consists only in the fact, statable in the metalanguage, that it is one member of a class of objects capable of performing the same sign function.

Another component of the problem enters in connection with the semantical dimension. The designatum of a sign is the class of objects which a sign can denote in virtue of its semantical rule. The rule may allow the sign to be applied to only one object, or to many but not to all, or to everything. Here "universality" is simply the potentiality of denoting more than one object or situation. Since such a statement is semantical, a statement can be made in terms of the converse of the relation of denotation: it can then be said that objects have the property of universality when denotable by the same sign. In so far as a number of objects or situations permit of a certain sign being applied, they conform to the conditions laid down in the semantical rule; hence there is something equally true of all of them, and in this respect or to this degree they are the same—whatever differences they may have are irrelevant to the particular case of semiosis. 'Universality (or generality) of objects' is a semantical term, and to talk as if 'universality' were a term in the thing-language, designating entities ("universals") in the world, is to utter pseudo thing-sentences of the quasi-semantical type. This fact was recognized in the Middle Ages in the doctrine that 'universality' was a term of second intention rather

than of first; in contemporary terms, it is a term within semiotic and not a term in the thing-language. In the thing-language there are simply terms whose rules of usage make them applicable to a plurality of situations; expressed in terms of objects it can only be said that the world is such that often a number of objects or situations can be denoted by a given sign.

A similar situation appears in syntactics, where the relations of sign vehicles are studied in so far as these relations are determined by formation or transformation rules. A combination of sign vehicles is a particular, but it may share its form with other combinations of sign vehicles, i.e., a number of combinations of different sign vehicles may be instances of the same formation or transformation rule. In this case the particular sign combination has a formal or syntactical universality.

From the standpoint of pragmatics two considerations are relevant to the problem in hand. One is the correlative of the semantical situation which has already been described. The fact that certain sign vehicles may denote many objects corresponds to the fact that expectations vary in determinateness, so that a number of objects may satisfy an expectation. One expects a nice day tomorrow—and a number of weather conditions will meet the expectation. Hence, while a response in a particular situation is specific, it is a true statement within pragmatics that similar responses are often called out by a variety of sign vehicles and are satisfied by a variety of objects. From this point of view the interpretant (in common with any habit) has a character of "universality" which contrasts to its particularity in a specific situation. There is a second aspect of sign universality distinguishable in pragmatics, namely, the social universality which lies in the fact that a sign may be held in common by a number of interpreters.

It is accordingly necessary to distinguish in the universality appropriate to semiosis five types of universality. Since the term 'universality' has such a variety of usages, and is clearly inappropriate in some of the five cases, the term 'generality' will be used instead. There are, then, five types of sign generality: *generality of sign vehicle, generality of form, generality of*

denotation, generality of the interpretant, and *social generality.* The central point is that each of these kinds of generality can be stated only within semiotic; generality is accordingly a relational concept, since all the branches of semiotic investigate only relations. To speak of something as a "general" or a "universal" is merely to use a pseudo thing-sentence instead of the unambiguous semiotical expression; such terms can only signify that the something in question stands to something or other in one of the relations embodied in the five kinds of sign generality which have been distinguished. In this way there is kept what is significant in the historical emphases of nominalism, realism, and conceptualism, while yet avoiding the last traces of the substantive or entitive conception of generality by recognizing the level of discourse appropriate to discussions of generality and the relational character of the terms employed at this level.

14. Interrelation of the Semiotical Sciences

Since the current tendency is in the direction of specialized research in syntactics, semantics, or pragmatics, it is well to stress emphatically the interrelations of these disciplines within semiotic. Indeed, semiotic, in so far as it is more than these disciplines, is mainly concerned with their interrelations, and so with the unitary character of semiosis which these disciplines individually ignore.

One aspect of the interrelation is indicated in the fact that while each of the component disciplines deals in one way or another with signs, none of them can define the term 'sign' and, hence, cannot define themselves. 'Syntactics' is not a term within syntactics but is a strictly semiotical term—and the same is true of 'semantics' and 'pragmatics.' Syntactics speaks of formation and transformation rules, but rules are possible modes of behavior and involve the notion of interpreter; 'rule' is, therefore, a pragmatical term. Semantics refers explicitly only to signs as designating objects or situations, but there is no such relation without semantical rules of usage, and so again the notion of interpreter is implicitly involved. Pragmatics deals directly only with signs as interpreted, but 'interpreter' and

'interpretant' cannot be defined without the use of 'sign vehicle' and 'designatum'—so that all of these terms are strictly semiotical terms. Such considerations—themselves only a few among many possible ones—show that, while the component semiotical disciplines do not as sciences refer to one another, yet they can be characterized and distinguished only in terms of the wider science of which they are components.

It is also true that a person who studies some dimension of semiosis uses terms which have all three dimensions and employs the results of the study of the other dimensions. The rules which govern the sign vehicles of the language being studied must be understood, and 'understanding' is a pragmatical term. The rules for combining and transforming possible sign vehicles cannot be composed merely of possible sign vehicles but must actually function as signs. In descriptive syntactics there must be signs to denote the sign vehicles being studied, and the aim must be to make true statements about these sign vehicles—but 'denote' and 'true' are not syntactical terms. Semantics will study the relation of a sign combination to what it denotes or can denote, but this involves the knowledge of the structure of the sign combination and the semantical rules in virtue of which the relation of denotation may obtain. Pragmatics cannot go far without taking account of the formal structures for which it should seek the pragmatical correlate, and of the relation of signs to objects which it seeks to explain through the notion of habit of usage. Finally, the languages of syntactics, semantics, and pragmatics have all three dimensions: they designate some aspect of semiosis, they have a formal structure, and they have a pragmatical aspect in so far as they are used or understood.

The intimate relation of the semiotical sciences makes semiotic as a science possible but does not blur the fact that the subsciences represent three irreducible and equally legitimate points of view corresponding to the three objective dimensions of semiosis. Any sign whatsoever may be studied from any of the three standpoints, though no one standpoint is adequate to the full nature of semiosis. Thus in one sense there is

no limit to either point of view, i.e., no place at which an investigator must desert one standpoint for another. This is simply because they are studies of semiosis from different points of view; in fastening attention upon one dimension, each deliberately neglects the aspects of the process discernible in terms of the other standpoints. Syntactics, semantics, and pragmatics are components of the single science of semiotic but mutually irreducible components.

VII. Problems and Applications

15. Unification of the Semiotical Sciences

There remains the task of briefly showing the problems which remain open within semiotic and the possible fields of application. These may be roughly grouped under three headings: unification of the semiotical sciences, semiotic as organon of the sciences, and humanistic implications of semiotic. The remarks which follow aim merely to be suggestive—to indicate directions rather than solutions.

The account which has been given has been adapted to the purposes of an introduction. Large areas of the field were ignored, exactitude in statement was often sacrificed to avoid lengthy preliminary analysis, and the consideration of the examples which were introduced was carried only so far as to illuminate the point at issue. Even though the larger outlines of semiotic be correct, it is still far from the condition of an advanced science. Progress will require collaboration by many investigators. There is need both for fact-finders and for systematizers. The former must make clear the conditions under which semiosis occurs and what precisely takes place in the process; the latter must in the light of available facts develop a precise systematized theoretical structure which future fact-finders can in turn use. One theoretical problem of importance lies in the relation of the various kinds of rules. The theory of signs which has been given opens up many points of contact with the concrete work of biologists, psychologists, psychopathologists, linguists, and social scientists. Systematization can profitably make use of symbolic logic; for, since semiotic deals throughout

with relations, it is peculiarly amenable to treatment in terms of the logic of relations. The work of fact-finders and systematizers is equally important and must go hand in hand; each provides material for the other.

Semioticians should find the history of semiotic useful both as a stimulus and as a field of application. Such hoary doctrines as the categories, the transcendentals, and the predicables are early sallies into semiotical domains and should be clarified by the later developments. Hellenistic controversies over the admonitive and the indicative sign, and the medieval doctrines of intention, imposition, and supposition are worth reviving and interpreting. The history of linguistics, rhetoric, logic, empiricism, and experimental science offers rich supplementary material. Semiotic has a long tradition, and in common with all sciences it should keep alive its history.

In the development of semiotic the disciplines which now are current under the names of logic, mathematics, and linguistics can be reinterpreted in semiotical terms. The logical paradoxes, the theory of types, the laws of logic, the theory of probability, the distinction of deduction, induction, and hypothesis, the logic of modality—all such topics permit of discussion within the theory of signs. In so far as mathematics is knowledge of linguistic structures, and not simply identified with some (or all) of such structures, it too may be considered as part of semiotic. Linguistics clearly falls within semiotic, dealing at present with certain aspects of the complex sign structures which constitute languages in the full semiotical sense of that term. It is possible that the admittedly unsatisfactory situation with respect to such terms as 'word,' 'sentence,' and 'part of speech' can be clarified in terms of the sign functions which various linguistic devices serve. Ancient projects of a universal grammar take on a new and defensible form when translated into the study of the way all languages perform similar sign functions by the use of different devices.

Logic, mathematics, and linguistics can be absorbed in their entirety within semiotic. In the case of certain other disciplines this may occur only in part. Problems which are often classed

as epistemological or methodological fall in large part under semiotic: thus empiricism and rationalism are at heart theories as to when the relation of denotation obtains or may be said to obtain; discussions of truth and knowledge are inseparably linked with semantics and pragmatics; a discussion of the procedures of scientists, when more than a chapter in logic, psychology, or sociology, must relate these procedures to the cognitive status of the statements which result from their application. In so far as aesthetics studies a certain functioning of signs (such as iconic signs whose designata are values), it is a semiotical discipline with syntactical, semantical, and pragmatical components, and the distinction of these components offers a base for aesthetic criticism. The sociology of knowledge is clearly part of pragmatics, and so is rhetoric; semiotic is the framework in which to fit the modern equivalents of the ancient trivium of logic, grammar, and rhetoric. It has already been suggested that psychology and the human social sciences may find part (if not the entire) basis of their distinction from other biological and social sciences in the fact that they deal with responses mediated by signs. The development of semiotic is itself a stage in the unification of sciences dealing in whole or in part with signs; it may also play an important role in bridging the gap between the biological sciences, on the one hand, and the psychological and human social sciences, on the other, and in throwing a new light upon the relation of the so-called "formal" and "empirical" sciences.

16. Semiotic as Organon of the Sciences

Semiotic holds a unique place among the sciences. It may be possible to say that every empirical science is engaged in finding data which can serve as reliable signs; it is certainly true that every science must embody its results in linguistic signs. Since this is so, the scientist must be as careful with his linguistic tools as he is in the designing of apparatus or in the making of observations. The sciences must look to semiotic for the concepts and general principles relevant to their own problems of sign analysis. Semiotic is not merely a science among sciences but an organon or instrument of all the sciences.

This function can be performed in two ways. One is by making training in semiotic a regular part of the equipment of the scientist. In this way a scientist would become critically conscious of his linguistic apparatus and develop careful habits in its use. The second way is by specific investigations of the languages of the special sciences. The linguistically expressed results of all the sciences is part of the subject matter of descriptive semiotic. Specific analyses of certain basic terms and problems in the various sciences will show the working scientist whatever relevance semiotic has in these fields more effectively than any amount of abstract argument. Other essays in the *Encyclopedia* may be regarded as contributing such studies. Current scientific formulations embody many pseudo problems which arise from the confusion of statements in the language of semiotic and the thing-language—recent discussions of indeterminism and complementarity in the physical sciences abound in illustrations. Empirical problems of a nonlinguistic sort are not solved by linguistic considerations, but it is important that the two kinds of problems not be confused and that nonlinguistic problems be expressed in such a form as aids their empirical solution. The classical logic thought of itself as the organon of the sciences but was, in fact, unable to play the role it set itself; contemporary semiotic, embodying in itself the newer logical developments and a wide variety of approaches to sign phenomena, may again attempt to assume the same role.

17. Humanistic Implications of Semiotic

Signs serve other purposes than the acquisition of knowledge, and descriptive semiotic is wider than the study of the language of science. Corresponding to the various purposes which signs serve, there have developed more or less specialized languages which follow to some extent the various dimensions of semiosis. Thus the mathematical form of expression is well adapted to stress the interrelation of terms in a language, letting the relation to objects and interpreters recede into the background; the language of empirical science is especially suitable for the description of nature; the languages of morality, the fine arts, and the applied arts are especially adapted to the

control of behavior, the presentations of things or situations as objects of interest, and the manipulation of things to effect desired eventuations. In none of these cases are any of the dimensions of semiosis absent; certain of them are simply subordinated and partially transformed by the emphasis upon one of the dimensions. Mathematical propositions may have an empirical aspect (many indeed were discovered empirically), and mathematical problems may be set by problems in other fields, but the language of mathematics subordinates these factors in order to better accomplish the task it is developed to fulfil. Empirical science is not really concerned with simply getting all true statements possible (such as the statement of the area of each mark on this page) but in getting important true statements (i.e., statements that, on the one hand, furnish a secure base for prediction and, on the other hand, that aid in the creation of a systematic science)—but the language of empirical science is adapted to expressing the truth and not the importance of its statements. Lyric poetry has a syntax and uses terms which designate things, but the syntax and the terms are so used that what stand out for the reader are values and evaluations. The maxims of the applied arts rest on true propositions relevant to the accomplishment of certain purposes ("to accomplish x, do so and so"); moral judgments may similarly have an empirical component but, in addition, assume the desirability of reaching a certain end and aim to control conduct ("You ought to have your child vaccinated," i.e., "Taking the end of health for granted, vaccination is in the present situation the surest way of realizing that end, so have it done").

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. Such an understanding is an effective aid in avoiding confusion of the various functions performed by signs. As Goethe said, "One cannot really quarrel with any form of representation"—provided, of course, that the form of representation does not masquerade as what it is not. In giving such understanding, semiotic promises to fulfil one of the tasks

which traditionally has been called philosophical. Philosophy has often sinned in confusing in its own language the various functions which signs perform. But it is an old tradition that philosophy should aim to give insight into the characteristic forms of human activity and to strive for the most general and the most systematic knowledge possible. This tradition appears in a modern form in the identification of philosophy with the theory of signs and the unification of science, that is, with the more general and systematic aspects of pure and descriptive semiotic.

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