

I do not suppose that I have given a demonstrative proof that potentiality is real. But I rest here with the quotation from Peirce with which I began: "The demonstrations of the metaphysicians are all moonshine. The best that can be done is to supply a hypothesis not devoid of all likelihood, in the general line of growth of scientific ideas, and capable of being verified by other observers."

Finally, it should be pointed out that if we ask what a potentiality really is, there are only two possible answers. We can either make a Humean analysis of potentiality, in which case we argue that the potentiality is not really in the object but is only an idea that we put into it, or we can argue that potentiality is a real feature of the object. If we accept the first alternative we have no basis for prediction as to how the object will behave. For, if the potentiality is merely an idea in my mind, there is no reason why objects should act in accordance with my idea of how they will act. If in fact they did do so, I could never have a false view about a scientific law; if I ever got an idea into my head about how objects behaved, then they would act in that way. It is obvious that the world does not change its mode of behavior to adapt itself to my ideas but rather that the converse is the case.

If we accept the second alternative, that the potentiality is a real feature of the object, we must, if we are to make this assertion meaningful, deny that all that is real are individuals. We must reject the nominalistic epistemology and admit a position that allows for real potentialities. If we admit that the function of knowledge is to enable us to control the future, then we must take potentialities seriously, for the future as known in the present consists entirely of potentialities, some of which will be actualized and some of which will not. Any epistemological approach that holds that potentialities are meaningless can not be adequate as a practical basis for human behavior or as a theoretical basis for science. An epistemology that takes into account the facts of human behavior and the working practices of science must recognize that potentialities, while they can not be identified with any class of individuals, are nevertheless real. And the reason they are real is because, as Peirce first showed us, the world is general.

PEIRCE'S ANALYSIS OF MEANING

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One of the most interesting problems of today's semiotics is the intensional analysis of the content of a given expression, that is, in Peircean terms, the study of the meaning, of the ground, of the interpretant, and of the Immediate Object of a sign, as far as these categories are distinguished from the one of Dynamical Object. This kind of study has assumed in the last two decades two forms, complementary and alternative to each other: the interpretative analysis with the format of a compositional spectrum of markers, and the generative analysis in the form of predicates and arguments. The aim of the present paper is to show that: (1) some elements of Peirce's thought can be reexamined in the light of such theoretical perspectives; (2) Peirce's theory of interpretant cannot but lead to a form of meaning analysis that fits both the requirements of an interpretative and a generative semantics; (3) only from Peirce's point of view can some aporias of contemporary semantic theories be satisfactorily solved.

Obviously, to test a nineteenth-century theory as the correct development of a contemporary one can be justified only as an abductive inference: I feel entitled to try this by the auctoritas of the great master we are celebrating in this congress.

According to the principles of compositional analysis, a semiotic expression (whether it is a verbal item or any other type of physical utterance) conveys, according to the linguistic conventions, an organized and analyzable content, formed by the aggregation (or hierarchy) of semantic features. These features constitute a system, either closed or open, and belong to different contents of different expressions in different arrangements. Compositional analysis should describe and define a virtually infinite number of contents by means of a possibly finite ensemble of features, but this exigence of economy gives rise to many aporias that make the existing instances of compositional semantics still unsatisfactory. If the features constitute a finite set of metasemiotic constructions, then their mode of describing a virtually infinite amount of contents sounds rather disappointing. By such features as "human," "animate," "masculine," and "adult" (see Chomsky) one can distinguish a bishop from a hippopotamus but not a hippopotamus from a rhinoceros. If, on the contrary, one elaborates more analytical metasemiotic features such as, for instance, "not-married" or "seal" (as it happens in the interpretative perspective of Katz and Fodor), one is obliged to foresee an incredible number of other features, such as, for instance, "lion," "bishop," or "with two eyes," thereby losing universality and running the risk that the set of metasemiotic features contains as many items as the language to be analyzed (and maybe more than that).

Moreover it is hard to establish to which kind of hierarchy these features should be accorded. A simple relation of embedding from genus to species can help only to a certain extent. It is obviously important, for example, to know that a schooner is a sailing ship, that a sailing ship is a vessel, a vessel a boat, and a boat a vehicle (marine), but this kind of classification does not distinguish a schooner from a brigantine since it disregards more synthetical features such as, for instance, the form of the sails and the number of the masts. Provided this requirement is satisfied, it remains to be known what purposes a brigantine or a schooner serve.

As a further criticism we can add that a compositional analysis in terms of universal features does not say satisfactorily in which linguistic environments the item can be inserted without producing ambiguity. There are rules of subcategorization, establishing the immediate syntactic compatibility of a given item, and there are selectional rules establishing some immediate semantic compatibility (the verb "to love" cannot have an inanimate entity as its own subject), but these instructions do not go beyond the normal format of a dictionary. Some scholars have proposed a semantic representation with the format of an encyclopedia, and this solution seems to be the only one capable of conveying the whole information entailed by a given term: but the encyclopedic representation excludes the possibility of establishing a finite set of metasemiotic features and makes the analysis potentially infinite.

Other approaches have tried to overcome these difficulties by representing the items of a lexicon as predicates with n arguments. Bierwisch, for instance, would represent 'father' as "X parent of Y + Male X + (Animate Y + Adult X + Animate Y)" and 'kill' as "X_s cause (X_d change to (- Alive X_d) + Animate X_d)." This kind of representation takes into account not only the immediate semantic markers (in the form of a dictionary), but also characterizes the item through the relations it can have, within the framework of a proposition, with other items.

Generative semantics has improved the use of predicate calculus, but has done so by shifting from the representation of single terms to the logical structure of the propositions (McCawley, Lakoff, and others). As far as I know, only Fillmore has tried, with his case grammar, to unify both interpretative-compositional and generative perspective. Fillmore remarks that the verbs "ascend" and "lift" are both motion verbs and are both used to describe a motion upward, but "lift" requires conceptually two objects (the one moving upwards, the other causing the motion), while "ascend" is a one-argument predicate. This remark leads one to recognize that arguments in natural languages can be identified with "roles" (similar to the "actants" in Greimas' structural semantics); for any predicate there is an agent, a counteragent, an object, a result, an instrument, a source, a goal, an experiencer, and so on. This kind of analysis solves very well the problem of the classification of features, following a sort of logic of action. Moreover, it satisfies the encyclopedical requirement and transforms a purely classificatory representation into an operational schema: the composition of the

meaning of a predicate tells us how to act in order to give rise to the denoted action, or in order to isolate it within a context. 'To walk', for instance, should mean that there is a human agent, using ground as a counteragent, moving his body in order to displace it (as a result) from a spatial source to a spatial goal, by using legs as instrument, and so on.

Some objections can, however, be raised:

1. Although the roles can be recognized as a set of innate universals expressed by a fixed inventory of linguistic expressions, the linguistic features that fill in these roles are again potentially infinite (how many kinds of instrument can be foreseen?).

2. The proposal of such a "case grammar" seems to work a propos of predicates but requires some additions as far as the representation of arguments is concerned. I can kill someone using a knife as an instrument, but what about the semantic representation of 'knife'? It seems that, more than a predicate/argument structure, it could be useful in this case to employ such categories as who produces it, with what material, according to what formal rule, and for what purposes. This kind of representation recalls the four Aristotelian causes (efficient, formal, material, and final); but the representation of an object could also be transformed into the representation of the action required to produce the object (therefore, not "knife" but "to make a knife").

3. A complete semantic theory should also take into account syncategorematic terms such as prepositions and adverbs ("for," "to," "below," "while," and so on). According to the research of many scholars (Leech, Apresjan, and others), it seems that this is possible; but, we are far from recognizing that this research is to be considered both satisfactory and definitive.¹

I think that an exploration into Peirce's theory of meaning and interpretant can help to greatly improve all of these approaches.

A first clue to our Peircean rereading is the observation that what a ship is can be given by interpreting the ship in terms of its origin, its form, its constitutive material, and its possible use: the problem of semantic features can be rephrased in terms of interpretants. There is, in any case, a sort of gap between contemporary compositional analysis and Peirce's semiotic account of interpretants. Contemporary analyses are mainly concerned with a semantics of verbal languages, while Peirce was dealing with a general semiotics concerning all types of signs. I have elsewhere demonstrated² that Peirce offered the theoretical opportunity of extending the problem of compositional analysis to every semiotic phenomenon, including images and gestures.

However, in order to maintain a certain parallelism between the two poles of our inquiry, I shall limit my discourse only to Peircean proposals and

1. For a discussion of all these problems, see my *A Theory of Semiotics* (Bloomington: Indiana University Press, 1976).

2. *Ibid.*

examples concerning verbal language, even though this methodological decision obliges me to underestimate the important relationship between symbols, icons, and indices. Someone could object that this limitation is imposed by the very nature of my subject matter: Peirce said that only symbols (not icons and indices) are interpretable. "Pragmaticism fails to furnish any translation or meaning of a proper name or other designation of an individual object" (CP 5.429); qualities have "no perfect identities, but only likenesses, or partial identities" (CP 1.418). Only symbols seem to be instances of genuine Thirdness (since they can be interpreted), whereas icons are qualitatively degenerate and indices are reactionally degenerate, both depending on something else without any mediation (the icon from a quality, the index from an object) (CP 2.92 and 5.73). Moreover, "it is not all signs that have logical interpretants, but only traditional concepts and the like" (CP 5.482). Nevertheless, I think that the context of Peirce's thought happily contradicts these statements.³ It is difficult to assume, as Peirce did in CP 1.422 and 447, that qualities are always general without asserting that they can and should be in some way defined and interpreted. And as far as icons are concerned, it should be remembered that the possibility of making deductions by observing those icons that are called diagrams depends on the fact that diagrams can be interpreted and do arouse interpretants in the mind of their interpreters.⁴ In any case and for the sake of simplicity, I shall consider only the sign-meaning relationship in verbal symbols.

"A sign stands for something to the idea which it produces, or modifies. . . . That for which it stands is called its *object*; that which it conveys, its *meaning*; and the idea to which it gives rise, its *interpretant*" (CP 1.339). Our problem is to define better these three categories by assuming first of all that the word 'sign' should be intended as an equivalent of 'representamen'. According to CP 1.540, the difference between a sign and a representamen seems to consist in the fact that the former is a concrete occurrence conveying some meaning to an interpreter, whereas the latter is an abstract theoretical tool that also can not be recognized as a sign by somebody on some occasion.

In order to understand the relationship between representamen (or sign), object, meaning, and interpretant, we must examine the concept of ground.

3. On this matter, Peirce contradicted himself. In 1885 (CP1.372): "a term is a mere general description," but "neither icon nor index possesses generality." But in 1896 (CP1.422 and MS 447), he claimed that qualities (which are Firstness as well as icons) are general. In 1902 (CP2.310), he thought that only a disign could be true or false, but in 1893 (CP2.441), he said that two icons can form a proposition: the icon of a Chinese and the icon of a woman can be composed together to form a proposition and therefore function as general terms. In 1902 (CP2.275), his claim was that an icon, even though being a mere image of the object, produces "an Interpretant idea." In CP2.278, icons were said to be able to work as predicates of an assertion. In order to explain these apparent contradictions, it should be said that Peirce distinguished icons as instances of Firstness (and thus as components of the process that goes from perception to judgment) from iconic representamens or hypoicons. Hypoicon, being a representamen, is already Thirdness and therefore interpretable. The entire matter is not, however, so clear; in 1906 (CP4.9), Peirce clearly asserted that "I recognize a logic of icons, and a logic of indices, as well as a logic of symbols."

4. Diagrams are interpretable (CP1.54). It is true that although symbols include their consequences, icons exhibit theirs (CP2.282, 1893). But in 1901 (CP3.641), Peirce clearly said that there is no substantial difference between reasoning by observing diagrams and reasoning by syllogisms. In 1905 (CP4.347), he said that in graphs "the necessary consequences of these logical relations are at the same time signified, or can, at least, be made evident by transforming the diagram in certain ways." See also CP4.354: "I use the word 'signify' in such a sense that I say that a relative rheme signifies its corresponding relation."

In CP 2.418 the object is more accurately defined as a correlate of the sign (the sign "man" can be correlated to the sign "homme" as its object), and the third element of the correlation, along with the interpretant, is not the meaning but the ground. A sign refers to a ground "through its object, or the common characters of those objects." The interpretant is very significantly defined as "all the facts known about its object."

In 1867 (CP 1.551), there was a clue capable of explaining why the term 'ground' can sometimes be substituted for 'meaning' and vice versa. The proposition "this stove is black" assigns to the word 'stove' a "general attribute." This kind of attribute is elsewhere called a "quality" and as such it should be a mere Firstness. But a quality, even though being in itself a pure monad, is something general when we are reflecting upon it (CP 1.425). In a Scotist line of thought, it is an individual—a monad—insofar as it is a quality of the thing, but it is universal—an abstraction—insofar as it is caught by the intellect. A quality is a "general idea" and an "imputed character" (CP 1.559): it is an intellegibile.⁵ Being a "general attribute" (CP 1.551.) it is, among the possible general attributes of the object, the one that has been selected in order to focus the object "in some respects." This expression was explicitly formulated later (for instance, in CP 2.228, thirty years later) but it was implicit in 1867 (CP 1.553.) when it was said that the interpretant represents the relate "as standing for" the correlate. The ground is an attribute of the object so far as it (the object) has been selected in a certain way; and only some of its attributes have been made pertinent, thus constituting the immediate object of the sign. The ground, being only one among the possible predicates of the object (the stove could also be perceived and described as hot, big, dirty, and so on), it is a "common character" and a "connotation" (CP 1.559; here connotation is opposed to denotation just as meaning is opposed to denotatum).

We will see later that the meaning seems to be something more complex than one imputed character or attribute; it is "a sort of skeleton diagram", an "outline sketch" of the object considering "what modifications the hypothetical state of things would require to be made in that picture" (CP 2.227). It can therefore be suggested at this point that the ground is only a meaning component: in fact, symbols that determine their grounds or imputed qualities, that is, terms, are "sums of marks" (CP 1.559). The purport of such a statement will become clearer later. For the moment it is sufficient to recognize that both ground and meaning are of the nature of an idea: signs stand for their objects "not in all respects, but in reference to a sort of idea, which we have sometimes called the *ground* of the representamen," and 'idea' is not meant in a platonic sense, but rather "in that sense in which we say that one man catches another man's idea" (CP 2.228). The ground is what can be comprehended and transmitted of a given object under a certain profile; it is

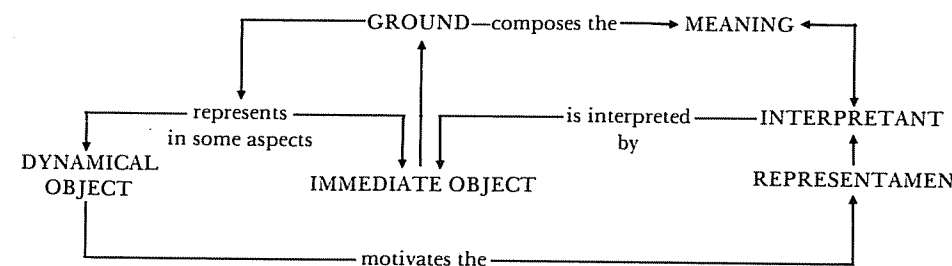
5. Since blackness is not considered in itself but is known by reference to the stove, it cannot but be attributed as a general. "We cannot comprehend an agreement of two things" but only "an agreement in some respect" (CP1.551).

the content of an expression and appears to be identical with meaning (or a basic component of it).

It remains to ascertain in which sense a ground (as a meaning) differs from an interpretant. In *CP* 1.339 (as well as in other passages), the interpretant is the idea to which the sign gives rise in the mind of the interpreter (even if the real presence of an interpreter is not required). For this reason the problem of interpretants is studied, more than in the framework of speculative grammar, in the framework of speculative rhetoric, which deals with the relationship between signs and interpreters. But we have seen that a ground is an idea in the sense in which an idea is caught during the communicative intercourse between two interpreters. Therefore, it should be said that there is no profound difference between the meaning (as a sum of grounds) and the interpretant, a meaning being capable of being described only by means of interpretants. The interpretant is a way to represent, by means of another sign ('man' equals 'homme'), what the representamen in fact selects of a given object (its ground).

The difficulty disappears, in any case, if one considers that the notion of a ground serves to distinguish the dynamical object (the object in itself such as it "by some means contrives to determine the Sign to its Representation" [*CP* 4.536]), from the immediate object, while the interpretant serves to establish the relationship between the representamen and the immediate object. The immediate object is the way in which the dynamical object is focused, this "way" being nothing else but the ground or meaning. In fact, the immediate object is "the Object as the Sign itself represents it and whose Being is thus dependent upon the Representation of it in the Sign" (*CP* 4.536). The dynamical object motivates the sign, but the sign through the ground institutes the immediate object, which is "internal" (*CP* 8.534), an "Idea" (*CP* 8.183), a "mental representation" (*CP* 5.473).

Obviously, in order to describe the immediate object of a sign, one cannot but make recourse to the interpretants of that sign.



In this sense, meaning (object of the speculative grammar) "is, in its primary acceptance, the translation of a sign into another system of signs" (*CP* 4.127), and "the meaning of a sign is the sign it has to be translated into" (*CP* 4.132.). So the interpretation by interpretants is the way in which the ground (as immediate object) is manifested as meaning. The interpretant (as object of speculative rhetoric) is without doubt "that which the Sign produ-

ces in the Quasi-mind that is the Interpreter" (*CP* 4.536); but, since the presence of the interpreter is not essential to the definition of the interpretant, this latter is "in the first place" to be considered as immediate interpretant, that is, "the interpretant as it is revealed in the right understanding of the Sign itself, and is ordinarily called the *meaning* of the sign" (*CP* 4.536). Therefore, being distinguished as formal objects of different semiotic approaches and in reference to different points of view, ground, meaning, and interpretant are in fact the same, inasmuch as it is impossible to define the ground if not as meaning and it is impossible to define any meaning if not as a series of interpretants. Many passages confirm this opinion: "by the *meaning* of a term...we understand the entire general intended interpretant" (*CP* 5.179); "it seems natural to use the word *meaning* to denote the intended interpretant of a symbol" (*CP* 5.175); "the complete Immediate Object, or meaning" (*CP* 2.293).

Nevertheless, we know that the interpretant is not only the meaning of a term but also the conclusion of an argument drawn from the premisses (*CP* 1.559). Has the interpretant a broader and more complex sense than meaning? In *CP* 4.127, when saying that "in its primary acceptance" meaning is the translation of a sign into another system of signs, Peirce said that, in another acceptance "here applicable" (Peirce was dealing with problems of logic of quantity), meaning "is a second assertion from which all that follows from the first assertion equally follows and vice versa... This is as much as to say that the one assertion 'means' the other." The meaning of a proposition, as well as its interpretant, does not exhaust its possibilities of being developed into other assertions, and in this sense is "a law, or regularity of the indefinite future" (*CP* 2.293). The meaning of a proposition embraces "every obvious necessary deduction" (*CP* 5.165). So the meaning is included by the premiss, and, in more general terms, meaning is everything that is semantically included by a sign.

At this point, however, the notion of meaning seems to be rather broad. Instead of being applied to single terms it is applicable to premisses and arguments. Is there, beyond the meaning of a dicent and of an argument, something like the particular meaning of a rheme? The answer to this question depends on the principle that everything that can be said of a dicent and of an argument can be said of the rhemes that constitute them. In other words, the theory of interpretants (and of meaning) concerns not only arguments but also single terms, and in the light of such a theory the content of a single term becomes something similar to an encyclopedia. Given the item 'sinner', the fact that it can be interpreted as "miserable" should be included or entailed by the compositional representation of it. Therefore, the rheme 'sinner' should include or entail all of the possible illative consequences regarding it. The argument "all sinners are miserable, John is a sinner, therefore he is miserable" is nothing else than the natural and necessary development of the incohesive possibilities of the rheme, and the only way to make evident its interpretants. Obviously, the opposite is also true; that is,

any argument is nothing but the analytical assertion of the interpretants to be assigned to a given term (from arguments, dicisigns and rhemes can be derived) (CP 3.440).

In CP 2.293 it is said that a symbol denotes an individual and signifies a character, this character being a general meaning (it should be remembered that the ground of a sign is its connotation and its imputed character [CP 1.559]). The distinction between denoting and signifying depends on the distinctions between extension and intension, breadth and depth, or—in contemporary terms—denotation and meaning, or referring to and meaning somewhat. The concept of depth is linked with that of information which is the “measure of predication” and “the sum of synthetical propositions in which the symbol is subject or predicate” (CP 2.418). All of these concepts concern not only propositions and arguments but also rhemes or terms.

“A *Rheme* is a Sign which, for its Interpretant, is a sign of a qualitative Possibility [it isolates a ground] that is, is understood as representing such and such kind of possible Object. Any Rheme, perhaps, will afford some information; but it is not interpreted as doing so” (CP 2.250). In other texts Peirce seemed to be less insecure. Not only “the signification of a term is all the qualities which are indicated by it” (CP 2.431), but terms appear as a set of marks (or features, or relations or characters [see CP 1.559]) ruled, as well as propositions, by the principle “nota notae est nota rei ipsius” (CP 3.166). “The marks already known to be predicable of the term include the entire depth of another term not previously known to be so included, thus increasing the *comprehensive distinctness* of the former term” (CP 2.364).

A term can have both necessary and accidental marks, the necessary being either strict or proper (CP 2.396), and those marks constitute the substantial depth of a term, that is, “the real concrete form which belongs to everything of which a term is predicable with absolute truth” (substantial breadth being “the aggregate of real substances of which alone a term is predicable with absolute truth”) (CP 2.414). In this sense, the depth of a term, or its intension, is the sum of intensional or semantic marks that characterize its content. Those marks are general units.⁶ Therefore, they are those imputed characters called “ground.” This set of features (or marks) is destined to grow along with the growth of our knowledge of the objects: the rheme attracts, so to speak, as a lodestone, all the new marks that the process of knowledge attributes to it: “every symbol is a living thing, in a very strict sense that is no mere figure of speech. The body of the symbol changes slowly, but its meaning inevitably grows, incorporates new elements and throws off old ones” (CP 2.222). All of this seems to suggest that the term is in itself an encyclopedia containing every character it can acquire in every new general proposition.

But all of this is something more than a mere suggestion. Peirce clearly stressed many times the fact that any term is in itself an inchoative proposition (any rheme is potentially the dicent in which it can be subsequently

6. “Nominantur singularia sed universalia significantur” (CP2.433 from John of Salisbury’s *Metalogicon*.)

inserted) and it is so in a way that recalls the contemporary semantic conception of a term as a predicate with n arguments. The meaning of a logical term is a *rudimentary assertion* (CP 2.342) in the same way in which a proposition is a rudimentary argumentation (CP 2.344.); this is the basic principle of interpretation, that is, the reason why every sign produces its own interpretants.

A term is a rudimentary proposition because it is the blank form of a proposition: “by *rheme*, or *predicate*, will here be meant a blank form of proposition which might have resulted by striking out certain parts of a proposition, and leaving a *blank* in the place of each, the part stricken out being such that if each blank were filled with a proper name, a proposition (however nonsensical) would thereby be recomposed” (CP 4.560). In CP 2.379, even though he was speaking of the form of propositions, Peirce showed that the verb *to marry* can be semantically represented as “____ marries ____ to ____.” This is the same as saying that, in order to represent generatively the syntactic nature of ‘to marry’, one should write “ $m(x,y,z)$.”⁷ This procedure, duly developed, implies that the semantic representation of a term is a matter of inclusion (what is today called semantic entailment, or the semantic presupposition as opposed to the referential one): $h_i \rightarrow d_i$ “means that on the occasion i , if the idea h is definitively forced upon the mind, then on the same occasion the idea d is definitively forced upon the mind” (CP 2.356). This is the principle of *nota notae* of traditional logic. But in the same pages, Peirce insisted on the possibility of an intensional logic to be opposed to the ordinary logic of general classes of things. He separated the problem of propositions in extension from that of propositions in comprehension, therefore elaborating twelve types of propositions in which the subject is a class of things but the predicate is a group of marks (CP 2.520-521).

One could object that the method of *blanks* is applicable only to verbs or predicates concerning actions, according to Peirce’s logic of relatives. In fact in Aristotle the word ‘rhema’ means only “verb.” However, Peirce often identified rheme with term: “any symbol which can be a direct constituent of a proposition is called term” (CP 2.328). There are also syncategorematic terms, whereas “any term fit to be subject of a proposition may be termed *onoma*” (CP 2.331). In any case, a common noun is a “rhematic symbol” (CP 2.261). In CP 8.337, it is claimed that class names and proper names are also rhemes. The reason for the choice of the term ‘rhema’ could be due to the fact that Peirce maintained that even nouns are reified verbs (CP 3.440 and CP 8.337). To definitely settle the question, “a rheme is any sign that is not true not false, like almost any single word except ‘yes’ and ‘not’” (CP 8.337).

In many instances Peirce made reference to the blank form when dealing with adjectives and nouns: in CP 1.363 the method is applied to ‘lover’ and ‘servant’, and in CP 4.438 the following example of rheme: “every man is the son of ____”, which constitutes a perfect example of the semantic repre-

7. See also CP 3.465.

sentation of the item 'father' viewed from the standpoint of a logic of relatives. The affinity of such a perspective with the one of a case grammar based on a logic of action will become more clear in a later paragraph. It is obvious that from such a point of view "proper nouns stand, but the demarcation of common nouns from verbs becomes indefensible," and "meaning of nouns in his logic of relatives, like that of verbs, lies in possible action."⁸

The best example of how a term can be resolved into a network of marks (this network constituting its meaning) is given in CP 2.330 with the definition of the word 'lithium':

If you look into a textbook of chemistry for a definition of *lithium* you may be told that it is that element whose atomic weight is 7 very nearly. But if the author has a more logical mind he will tell you that if you search among minerals that are vitreous, translucent, grey or white, very hard, brittle, and insoluble, for one which imparts a crimson tinge to an unluminous flame, this mineral being triturated with lime or witherite rats-bane, and then fused, can be partly dissolved in muriatic acid; and if this solution be evaporated, and the residue be extracted with sulphuric acid, and duly purified, it can be converted by ordinary methods into a chloride, which being obtained in the solid state, fused, and electrolyzed with half a dozen powerful cells will yield a globule of a pinkish silvery metal that will float on gasoline; and the material of *that* is a specimen of lithium. (CP 2.330)

This definition sounds strikingly similar to an analysis in terms of semantic marks organized according to a case grammar of some sort. What makes the analogy hard to establish is the fact that Peirce's definition contains an impressive amount of characters, difficult to be organized into a structure of arguments and predicates or of different actions and actants. Peirce showed how a representation in the form of an encyclopedia should be, but he did not say how it could be formally elaborated. One of the reasons for such complexity is that in this definition there is no sharp distinction between the marks that should be basically attributed to the meaning and those that can be further interpreted as included in or entailed by the basic ones, according to the principle of *nota notae*. Had Peirce said that lithium is an alkaline metal, some of its properties could have been considered as semantically included by the first character. But Peirce was not giving an example of an "economical" definition: on the contrary, he was showing how a term includes the globality of information about it. A satisfactory translation of this definition into a formal semantic representation should distinguish those two levels of interpretation.

Another aspect of the above definition is that it constitutes, despite its encyclopedic complexity, only a section of the possible global encyclopedia of 'lithium.' The immediate object established by the definition focuses the corresponding dynamical object only in some respects; that is, it takes into account only what is required in order to insert the term within a strictly chemical physical proposition or argumentation. This means that the regulative model of an encyclopedia foresees many "paths" or many complementary disjunctions of the entire semantic spectrum. The marks imputed here

8. See Feibleman, *An Introduction to Peirce's Philosophy* (Cambridge: M.I.T. Press, 1946), 106-107, with reference to the passage that will be examined in my next paragraph.

should have been labeled as concerning a technical universe of discourse. Lithium is a vitreous translucent mineral which sometimes appears as a globule of pinkish silvery metal; if the universe of discourse had been an imaginary one (for instance, a fairy tale), then those marks would have been focused differently and organized along with others that do not appear in the above representation. For instance, lithium is known as the lightest solid element at ordinary temperature, and this character of "lightness" should have been considered in another context. Peirce was conscious of this problem and the solution that his whole philosophical system provides for it concerns some crucial problems of contemporary semantics, namely, (1) whether the marks are universal and finite in number or not, and (2) what the size is that the encyclopedic representation should assume in order to be both satisfactory and reasonably reduced.

In light of the Peircean notion of interpretant, one no longer needs a finite set of metasemiotic constructions. For sign interpreting another sign, the basic condition of semiosis is its being interwoven by signs sending back to signs, in an infinite regression. In such a theoretical landscape any interpretant of a given sign, being in turn and under other circumstances a sign, becomes temporarily a metasemiotic construction acting (for that occasion only) as explicans of the interpreted explicatum and being in turn interpreted by another interpretant:

The object of representation can be nothing but a representation of which the first representation is the interpretant. But an endless series of representations, each representing the one behind it, may be conceived to have an absolute object as its limit. The meaning of a representation can be nothing but a representation. In fact, it is nothing but the representation itself conceived as stripped of irrelevant clothing. But this clothing never can be completely stripped off; it is only changed for something more diaphanous. So there is an infinite regression here. Finally, the interpretant is nothing but another representation to which the torch of truth is handed along; and as representation, it has its interpretant again. Lo, another infinite series. (CP 1.339)

This infinite series could, however, make the semantic encyclopedia unattainable, and the work of semantic analysis continuously baffled by its own need of completedness. But there is a logical limit, and the encyclopedia cannot be infinite; this limit is just the universe of discourse. The list of the twelve propositions in comprehension quoted above (CP 2.521) presupposes a limited universe of marks.

An unlimited universe would comprise the whole realm of the logically possible.... Our discourse seldom relates to this universe: we are either thinking of the physically possible, or of the historical existent, or of the world of some romance, or of some other limited universe.... A universe of things is unlimited in which every combination of characters, short of the whole universe of characters, occurs in some object.... In like manner, the universe of characters is unlimited in case every aggregate of things short of the whole universe of things possesses in common one of the characters of the universe of characters.... In our ordinary discourse, on the other hand, not only are both universes limited, but, further than that, we have nothing to do with individual objects or simple marks; so that

we have simply the two distinct universes of things and marks related to one another, in general, in a perfectly indeterminate manner. (CP 2.519-520)⁹

The notion of a universe of discourse along with that of a "possible world" (CP 2.232) links any semantic representation to contextual selections,¹⁰ and opens interesting perspectives on contemporary text grammars.

There is, however, another question to consider. The fact that lithium is vitreous, translucent, hard, brittle, and so on seems to be, without any doubt, a matter of predication in terms of general qualities (or marks or characters). But what about the fact that "if triturated with lime and if refused *then* partly dissolving in muriatic acid"? To be grey is a quality, to react in a given way to a given excitement is a sort of behavior or a sequence of facts confirming an hypothesis. Obviously this sequence of facts "interprets" the first sign, but this would mean only that—even though characters are interpretants—not all interpretants are mere characters.

Nevertheless, it is also the case that "a portrait with the name of the original below is a proposition" (CP 5.569). This statement involves a double consequence: on the one hand, an icon is basically a ground, a quality, a Firstness; on the other hand, what we commonly call an icon (for instance, a painting) is not a mere icon, but rather, a hypoicon or iconic sign, that is, a complex interpretant of, say, the name below it; only in this way can an icon act as a subject term in a proposition. Moreover, suppose that this icon was a fresco representing the fall of Constantinople: it is undeniable that it should be interpreted and that it could arouse a lot of possible inferences in the mind of its possible interpreter.

To generate a further question, it should be remembered that in some cases the Dynamical Object of a sign can also act as its interpretant. The most typical case is the command "Ground arms!" which has as its proper object either the subsequent action of the soldiers or "the Universe of things desired by the Commanding Captain at that moment" (CP 8.178): a very ambiguous definition, since the response of the soldiers seems to be, at the same time, both the interpretant and the object of the sign. Undoubtedly, a lot of subsequent behavioral responses, verbal answers, images interpreting a caption, and vice versa are interpretants.¹¹ Are they characters? In order to answer this question, one should note that: (1) even qualities are always as complex as sequences of facts, and (2) even sequences of facts are as generalizable as are marks.

Now, Peirce said with absolute clarity that even though they are qualities, marks are not mere Firstnesses; they are general and there is no "redness"

9. This view is consistent with Peirce's cosmology. There is an ideal world (in which two contradictory propositions are possible), and there is an actual world (in which, given a possible proposition, its contradictory is impossible); the latter is a selection and an arbitrary determination of the former (CP 6.192). The actual universe, in respect to that vast representamen (CP 5.119), which is the entire universe perfused with signs (CP 5.448n.), is a "universe of discourse," so to speak, reducing all of the possible characters to a manageable number.

10. See, for example, Eco, *A Theory of Semiotics*, paragraph 2.11.

11. The example of "Ground arms!" is repeatedly cited (see, for instance, CP 8.315 and MS 179). As for a broad acceptance of interpretant, "we may take a sign in so broad a sense that the interpretant of it is not a thought, but an action or an experience, or we may even so enlarge the meaning of a sign that its interpretant is a mere quality of feeling" (CP 8.332).

that is not the result of a perceptual construction, not a pure perception but a percept (the percept "is a construction," and the perceptual fact is "the intellect's description of the evidence of the sense" [CP 2.141]). But in order to have this intellectual construction, one passes from a mere percept (a Rheme) to a Perceptual Judgement of which such a fact is the Immediate Interpretant (CP 4.539). And a perceptual judgement is "a judgement asserting in a propositional form what a character of a percept directly present to the mind is" (CP 5.54). To say that something is red does not mean that we have seen it: we have received an image but the assertion that this something has the attribute of being red is already a judgement. Thus, since no mark is a mere Firstness, every mark is inserted into a correlation as a fact, a mark's predication is always an experience of thirdness.¹²

In this sense, then, there is no substantial difference between saying that lithium is green and saying that lithium "dissolves when triturated." In the former case, we have something similar to a dicisign, in the latter something similar to an argument, but both "signs" interpret the rheme lithium. There is no methodological difference between characters and other sorts of interpretants from the point of view of the description of the meaning of a term. To attribute a mark is only a perceptual judgment, but perceptual judgments are to be regarded as an extreme case of abductive inference.

On the other hand the very fact that some soldiers, in different circumstances, accomplish a given regular action every time "Ground arms!" is uttered by an officer, means that this behavior is already subsumed under a concept, has become an abstraction, a law, a regularity. In order to be inserted into this relation the behavior of the soldiers has become something general, like the quality of redness, insofar as it is intended as a character.

What remains to be asked is how, in the philosophy of a thinker who calls himself a Scotist realist, there can be something like an infinite semiotic regression, where the object that has determined the sign is apparently never determined by it, if not in the phantasmatic form of immediate object. This can be explained only from the point of view of speculative rhetoric and in the light of the pragmatist notion of final interpretant; only then will it be possible to understand why Peircean semantics assumes a rudimentary format of a case grammar.

How can a sign express a dynamical object belonging to the outer world (CP 5.45), inasmuch as "from the nature of things" it cannot express it (CP 8.314)? How can a sign express the dynamical object ("the Object as it is" [CP 8.183], an object "independent of itself" [CP 1.538]) inasmuch as "it can only be a sign of that object in so far as that object is itself of the nature of a sign or thought?" (CP 1.538). How are we to link a sign to an object if in

12. See CP 5.182, 157, 150, and 183; all this was written between 1901 and 1903. In 1891 (reviewing the *Principles of Psychology* by James), Peirce was more cautious: "In perception, the conclusion has the peculiarity of not being abstractly thought, but actually seen, so that it is not exactly a judgment, though it is tantamount to one" (CP 8.65). "Perception attains a virtual judgment, it subsumes something under a class, and not only so, but virtually attaches to the proposition the seal of assent" (CP 8.66).

order to recognize an object one needs a previous experience of it (CP 8.181) and the sign does not furnish any acquaintance or recognition of the object (CP 2.231)? The answer is already given at the end of the definition of lithium: "the peculiarity of this definition—or rather this precept that is more serviceable than a definition—is that it tells you what the word *lithium* denotes by prescribing what you are to *do* in order to gain a perceptual acquaintance with the object of the word" (CP 2.330). The meaning of a symbol lies in the class of actions designed to bring about certain perceptible effects."¹³ The idea of meaning is such as to involve some reference to a purpose (CP 5.165). All of this can become more clear if one realizes that the so-called Scotist realism of Peirce cannot be understood outside the perspective of his pragmatism. Reality is more a result than a mere datum. And in order to clearly understand what the meaning of a sign is destined to produce as result, one must consider the notion of final interpretant.

By producing series of immediate responses (energetic interpretants), a sign establishes step by step a habit, a regularity of behavior in the interpreter or user of it. A habit is "a tendency...to behave in a similar way under similar circumstances in the future" (CP 5.487); the final interpretant of a sign is this habit as a result (CP 5.491). This is just to say that the correspondence between meaning and representamen has assumed the format of a law; but this also means that to understand a sign is to learn what to do in order to produce a concrete situation in which one can obtain the perceptual experience of the object to which the sign refers.

But the category of "habit" has a double sense, a behavioral (or psychological) and a cosmological one. A habit is a cosmological regularity: even the laws of nature are the results of habit-taking (CP 6.97), and "all things have a tendency to take habits" (CP 1.409). If a law is an active force (a Secondness), order and legislation are a Thirdness (CP 1.337); to take a habit is to establish or assume an ordered and regulated way of being. Therefore, coming back to the definition of lithium, the final interpretation of it stops at the production of a habit in a double sense: there is the human habit to understand the sign as an operational precept, and there is the cosmological habit according to which there will always be lithium every time nature behaves in a certain way. The final interpretant expresses the same law governing the dynamical object by prescribing both the way in which to experience the perception of it, and the way in which it works and is perceptible.

At this point, we can understand what kind of hierarchy rules the disposition of interpretants in this tentative model of semantic representation: it is an ordered and purposeful sequence of possible operations. Marks are not organized according to some "logical" embedding in terms of genera and species, but rather according to the essential operations to be performed by an agent, using a certain instrument upon a certain object in order to overcome the resistance of a counterobject so as to attain a certain goal. In this

13. Thomas A. Goudge, *The Thought of C. S. Peirce* (Toronto: University of Toronto Press, 1950), 155.

way, the apparent opposition between the intensional semantics of infinite semiotic regression and the extensional semantics of reference to dynamical objects is solved.

It is true that signs cannot give us a direct acquaintance with objects, because they can only prescribe to us what to do in order to realize this acquaintance. Signs have a direct connection with dynamical objects only insofar as objects determine the formation of a sign; on the other hand, signs only "know" immediate objects, that is, meanings. There is a difference between the object of which a sign is a sign and the object of a sign; the former is the dynamical object, a state of the outer world, the latter is a semiotic construction and should be recognized as a mere object of the inner world; however, in order to describe this "inner" object one should make recourse to interpretants, that is to other signs taken as representamen, therefore experiencing other objects of the outer world.

The dynamical object is, semiotically speaking, at our disposal only as a set of interpretants organized according to a compositional spectrum operationally structured. But although it is, from a semiotic point of view, the possible object of a concrete experience, from an ontological point of view it is the concrete object of a possible experience.¹⁴

14. I am indebted to C. P. Caprettini's "Sulla semiotica di Ch. S. S. Peirce," *I/S*, 15(1976) apropos some observations on "grounds" (personal communication).