

A Visual Model of Peirce's 66 Classes of Signs Unravels His Late Proposal of Enlarging Semiotic Theory

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Abstract. In this paper I will present the visual model of Peirce's 66 classes of signs, which I call the Sigtree Model, and show how the model helps on developing the enlarged semiotic system that Peirce left unfinished. Peirce's best-known classification is that of 10 classes of signs. However, in his later years, when developing the sign process in much greater detail, Peirce proposed a classification of no less than 66 classes of signs. In contrast to the first classification, Peirce never worked out the details, making it a difficult topic that has received little attention from semioticians. For a better understanding of the 66 classes, I built the Sigtree Model, which makes clear that the 66 classes work together composing a single dynamic system. As the Sigtree describes all the 66 classes and visually shows how they are related in a dynamic system, the model can be a powerful tool for semiotic analysis, revealing details of a complex process composed of many elements and multiple relations emphasizing semiosis and the growing of signs. More than that, the Sigtree gives clues about philosophical issues such as the relation between semiotic and pragmatism, between semiotic and metaphysics, and the relation among the three branches of semiotic: speculative grammar, critical logical and methodetic.

1 Introduction

Peirce conceived of his semiotic as a logical discipline, an abstract and general theory for the mapping, classification, and analysis of sign processes. His best known and most thoroughly elaborated general classification of signs consists of ten main classes, but Peirce went further in his reflections on

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the classification of signs until he arrived at a system of sixty-six classes. However, he did not elaborate this system of sixty-six classes in a detailed manner, and it remained an unfinished project, which became a controversial topic in Peircean scholarship.

I have been dedicating my research to this controversial topic for a good number of years. Two years ago I proposed a visual model to represent the 66 classes of signs, which I called *Signtree*. The idea was to build a model that could visually describe the 66 classes and to show the complexity of the sign system. With that purpose, I created a 2D model and 3D model. The 2D model was used as a guide to build the side views and then create the 3D model. Both diagrams describe the logical structure of all the 66 classes of signs and present them together as a complex system. But only the 3D model made explicit the dynamic of this system and the relations between semiotics and Peirce's philosophy.

The purpose of the visual model was to provide a detailed graphical representation and to contribute to a better understanding of this system. Graphical diagrams are very useful in making complex and abstract conceptual systems more clear. They streamline the work with the large number of classes that are related to each other in many different ways, because in the visual model one can see the whole set of classes at the same time. On a written text the classes of signs have to be described one after the other, and, no matter how much one tries to explain their relations, they can never appear together.

The proposed graphical model has been repeatedly subjected to revision and testing. Since its first appearance, the *Signtree* has gone through some improvements specially an important change on its design. The change was not on its logical structure, but on its visual form, making the *Signtree* model more accurate and representative of Peirce's semiotics. The details of the change will be presented later on.

On this paper I will present some diagrams to show the creation process of the model and I will demonstrate that the 66 classes of signs as displayed in the *Signtree* can help on developing a method to apply all these classes on semiotic analysis and also that observing and experiencing this complex semiotic system shows some clues about philosophical issues.

Peirce defines semiotics as the 'science of the necessary laws of thought' [17, 1.444]. The study of signs begins with the observation of the signs characteristics that are well known and continues, in processes of abstraction and inferences, with the elaboration of a more comprehensive general system of all possible types of signs. Any classification is fallible and must be subject to a critical reexamination in processes of abstraction and learning from observation and experience. Abstraction involves mental diagrams as useful tools in the discovery of conceptual structures. By means of observing a mental diagram, new insights about the domain under scrutiny may be obtained [17, 2.227]. The present study follows these Peircean guidelines in its proposal of

a graphical representation of the sixty-six classes of signs and in its revision and testing.

The model was created according to the logic of the phenomenological categories applied to the ten trichotomies, which produces the 66 classes of signs. I will briefly present the phenomenological categories and the sign trichotomies so that you can understand how the Signtree represents these concepts. I am not going deeper on its explanation for the sake of not drifting from the course of this presentation.

2 The Phenomenological Categories

Peirce's three phenomenological categories of firstness, secondness, and thirdness, are the foundation of his semiotics [17, 8.328]. According to their definition, "the First is that which has its being or peculiarity within itself. The Second is that which is what it is by force of something else. The Third is that which is as it is owing to other things between which it mediates" (W5: 229). The three categories are interrelated as follows: firstness is independent of any other category; secondness depends on firstness; and thirdness depends on secondness and firstness. They are represented in the model as circles, squares and triangles respectively (Fig. 1).

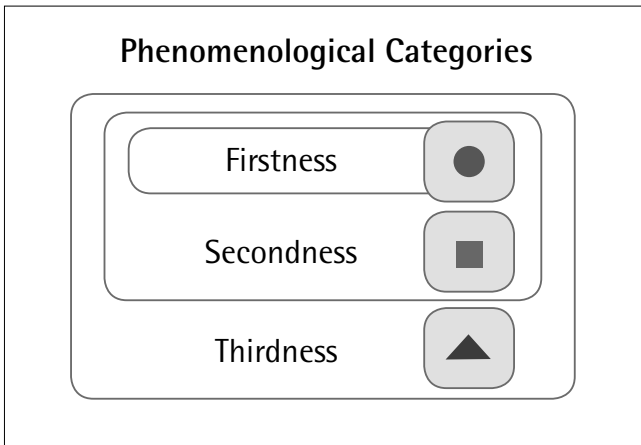


Fig. 1 The phenomenological categories.

3 The Sign Trichotomies

Among Peirce's many definitions of the sign is the following: "A REPRESENTAMEN is a subject of a triadic relation TO a second, called its OBJECT, FOR a third, called its INTERPRETANT, this triadic relation being such

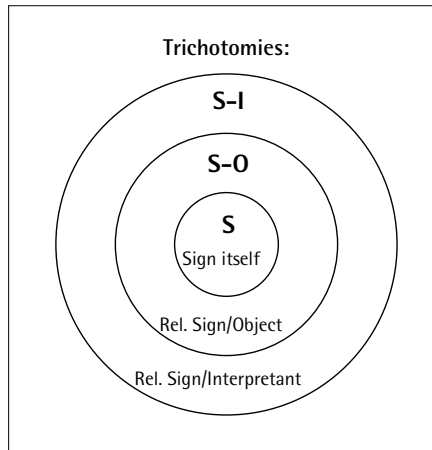


Fig. 2 The 3 sign trichotomies.

that the REPRESENTAMEN determines its interpretant to stand in the same triadic relation to the same object for some interpretant” [17, 1.541].

In his earlier classification of signs, Peirce considers only three trichotomies: the sign in itself, the sign in relation to its object, and the sign in relation to its interpretant. Each of these trichotomies belongs to one of the three phenomenological categories.

The first sketch in the elaboration of the 2D diagram was a tree diagram with upward branches for the ten classes of signs. The growth of a tree indeed evinces an affinity with sign processes, since each bifurcation of a branch results in a triadic structure. The temporal order in the sequence of the antecedent to the subsequent evinces another affinity between the growth of signs in semiosis and the growth of the branches of a tree (Fig. 2).

Inspired by the idea of the parallelism between the growth of trees and the growth of signs, the Sigtreen adopted the diagrammatic image of tree rings used in dendrochronology to count the age of the trees by counting their annual growth rings and to derive insights into climate changes over the centuries from their size. More than signs of time, tree rings are indices of influences between ecological systems. The growth of tree rings has affinities with the process of semiosis. The first trichotomy lies in the center of all rings; the next trichotomy begins with the second ring, and so on.

Peirce derived his ten main classes of signs from the logic of his phenomenological categories. Thus, if the first constituent of the trichotomy is of the nature of firstness, it can only determine relations of this very category. If the first constituent of the trichotomy is an existent, which is of the nature of secondness, then it can determine as its second constituent a relation of mere possibility (firstness) or existence (secondness). Finally, if the ground of the sign

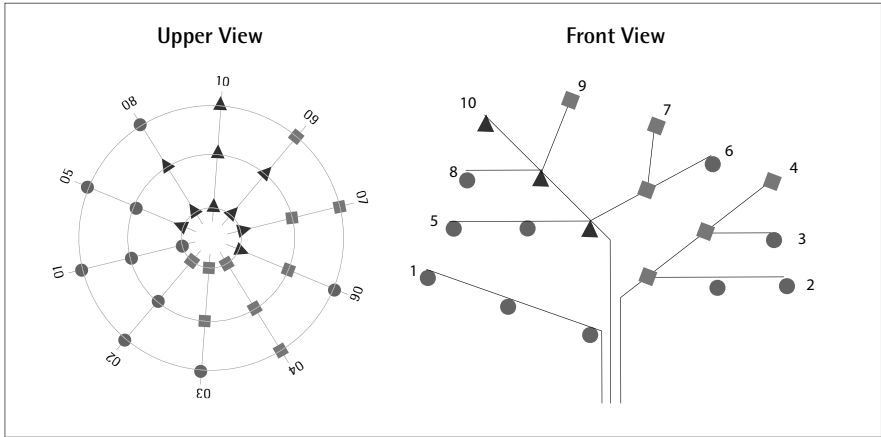


Fig. 3 The reduced Sigtree Model (10 classes).

is a law (thirdness), the relation between sign and its object can be one of a possibility (firstness), existence (secondness), or law (thirdness) (Fig. 3).

It is well known that Peirce expanded the system of sign relations first by introducing the additional subdivision of the object into the immediate and dynamical object and then by introducing the subdivision of the interpretant into the immediate, the dynamical and the final one. The immediate object is the way in which the dynamical object is represented within the sign. The dynamical object is the object that is outside the sign and which the sign intends to represent. To represent it, the sign must determine an interpretant, which also represents the object of the sign. That is possible because within the sign there is the immediate interpretant, which has the power of determining an interpretant outside the sign, that is, the dynamical interpretant. This dynamical interpretant is an interpretant produced in an interpreting mind. A sign can determine more than one dynamical interpretant since all dynamical interpretants are potentially contained in the immediate interpretant. The final interpretant is the interpretative result to which every interpreter might come when the semiotic process is sufficiently developed [24, pp. 493–94] (Fig. 4).

The system of the 66 classes obeys the same logical rules, which determine the system of the ten classes of signs. When three trichotomies are considered, the structure of each sign must be described in three stages; with ten trichotomies, each class must be described in ten stages (Fig. 5).

4 The 10 Trichotomies and Their Determining Order

The logical premises valid for the elaboration of the ring shaped diagram proposed in this paper initially suggested that the central ring should represent

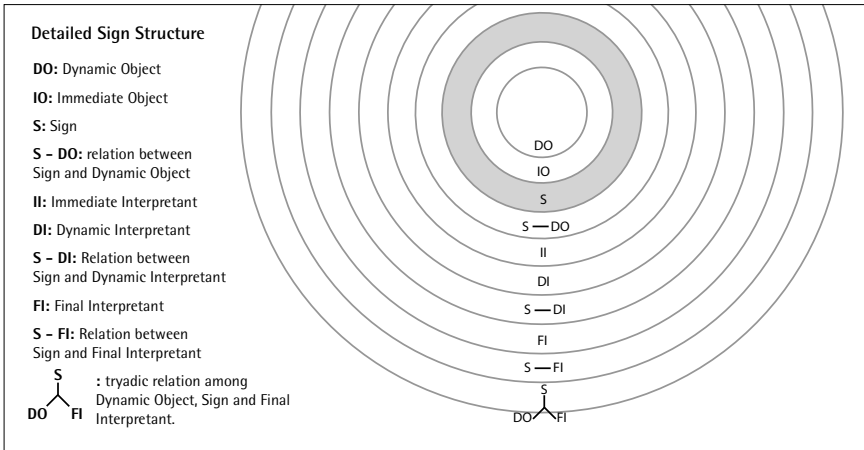


Fig. 4 The 10 sign trichotomies.

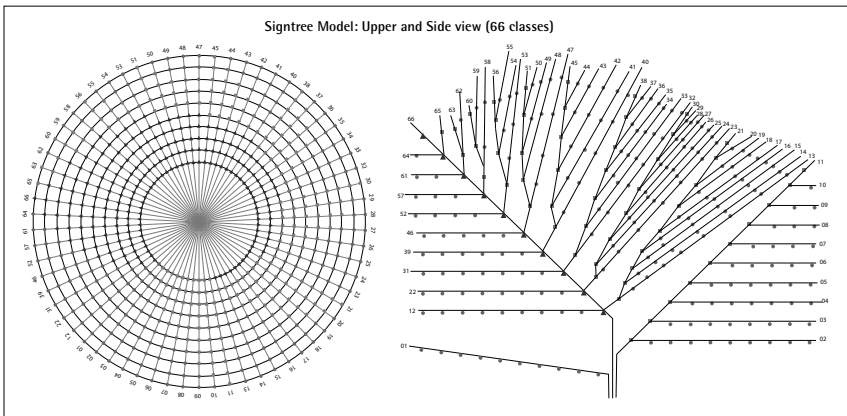


Fig. 5 The Signtree Model (66 classes).

the ground of the sign, since this is where a process of semiosis has its origin. A diagram following this line of thought would have two advantages: first, it would be in accordance with Peirce’s own description of the processes of semiosis and his order of the ten trichotomies of 1908; second, it would bring into relief the relation of the sign with its object, showing that the cognition and semiosis begins with the sign.

However, a diagram constructed in this way would not sufficiently comply with Peirce’s premises concerning the possible relations between the ground of the sign and its immediate object [17, 8.353–365]. According to the logic of the ring diagram, the rings evince relations of determination in the order

from their inclusion. Hence, since the object determines the sign and not vice-versa, it is necessary to put the dynamical object in the central ring, followed by the immediate object and the ground of the sign.

The diagram complies with Peirce's premise that everything we can tell about the object is what the sign exhibits of it; this is why the representation of human knowledge appears in the middle and not in the beginning of the semiotic process in its diagrammatic representation. To represent the object centrally as the starting point of the process of semiosis is then a good diagrammatic method of showing that the origin of knowledge is not the human being. Representing the dynamical object in the center of the diagram also allows showing that the process of semiosis is more encompassing than the human mind and that humans on their own will never have full but only approximate cognizance of either the origin or the endpoint of this process. To place the object at the center, which represents the starting point of the process of semiosis, is also in agreement with Peirce's premise that there is indeed a reality, which does not depend on what we think of it. Furthermore, it is in accordance with the theory of semiotic growth, which takes the concept of intelligence far beyond the limits of the human mind. Last, but not least, the central circle can also represent the backward movement exerted by the dynamical object, whereas the ring of its periphery can represent the infinite possibilities of semiosis, both representing a temporal order similar to the one represented by the tree diagram.

The Signtree takes uncertainty and the theory of continuum into account. Its center represents the incomplete knowledge of the dynamical object in the uncertainty of its beginning. Its line of circumference represents the growth of rings as a growth of signs in time. The triadic relations represented by the last circumference of the circle stand for the growth of semiosis in its form of overlapping rings, in which the subsequent ring does not annihilate its antecedent ring, showing that both represent the growth of ideas. The interpretation of a sign is a process in which further signs are created with the same potential, which in turn accounts for the logical possibility of infinite semiosis; its further implications will be discussed below.

5 Further Implications of the Diagram

What are the relations between Peirce's philosophy and his semiotics that can be elucidated by the diagram of his thought? The 2D diagram served as a guide for the design of the ground plan and the side view further to be elaborated as the 3D diagram. These diagrams offer a detailed representation of the logical structure of the sixty-six classes of signs. They show a complex and coherent system without isolating any of its elements. However, only the 3D model is able to shed light on the relation between semiotics and Peirce's philosophy. Represented in the form of a tree with root and braches, the diagram

of the system of signs has ecological implications of growth. (To see the 3D model please access: <http://www.youtube.com/watch?v=04iRLlkFSLk>)

Let us consider how the roots are formed. As shown above, the dynamical object of semiosis always goes back in time in relation to the sign; it is never fully apparent in the sign in all of its implications. The sign can represent it in many different ways, but always only partially, never completely. Since it is impossible to have full access to the dynamical object, one might say, it is withdrawing itself. Its movement of withdrawal is represented in the axle z by the direction indicated by the negative sign. Since the dynamical object is located in the central ring, we can imagine that its movement of withdrawal forms the trunk and roots of the tree.

To see how the branches grow, it is necessary to consider the exterior rings. The last three rings show the final interpretant, the relation between the sign and its final interpretant, and the relation between the dynamical object, the sign, and its final interpretant. Since the final interpretant is not an existent, but a possible representation created by the sign, the end of the semiotic process is unattainable; the goal of semiosis is always in the future *ad infinitum*. The ring that represents the relation between the sign and its final interpretant points to the description of the process of semiosis in its complete way: the triadic relation between the object, the sign, and its interpretant.

Two processes are going on simultaneously in semiosis. On the one hand, the dynamical object withdraws in the direction of the ground, forming the trunk and the roots. This movement makes the object more complex and impedes the possibility of the full representation of the sign. On the other hand, the triadic sign relation involves a process of mediation, which can also be understood as a way of thought. This process indicates the growth of signs, represented by the branches in the diagram. The nature of these two processes justify the assumption that the movement of withdrawal of the dynamical object represents a link between semiotics and metaphysics, whereas the representation of the growth of semiosis, evident from the insight that the final interpretant is in the future, constitutes a link between semiotics and pragmatism. These hypotheses concerning the connections between semiosis and the sciences are supported by ideas which Peirce elaborates in his “critical analysis of logical theories” under the title of *Minute Logic* [17, 2.1–118]. In a passage from this treatise, Peirce emphasized that metaphysics is possible only if “founded on the science of logic” [17, 2.36], that is, on semiotics.

Taking into account the trichotomy order and the imagined movement of the dynamical object forming the roots, I decided to draw roots on the diagram (Fig. 6). To do that, instead of representing the dynamic and immediate object trichotomies, that are the first two in the center of the diagram, on the branches, I represented them on the roots of the tree. This change emphasized that human experience begins with the sign, which is the first trichotomy to appear in the branch. Although the sign represents and give

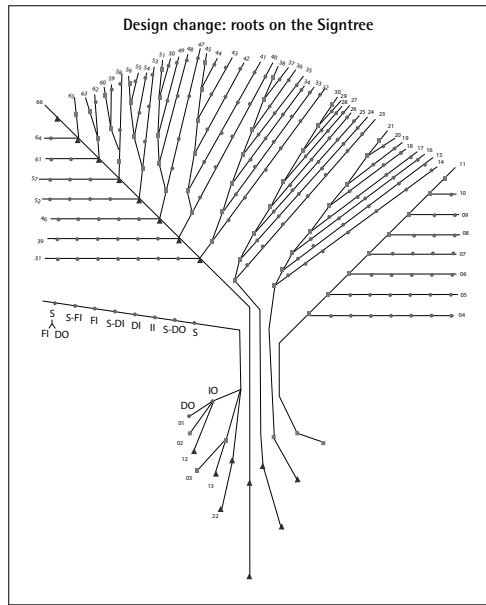


Fig. 6 Design change: roots on the Signtree.

information about the object, the sign is determined by the object, which is underneath the ground.

How metaphysics and pragmatism are founded on semiotics will become evident if one considers the starting and end point of the diagram. Why are there on the first trichotomy only one class of firstness, 10 of secondness and 55 of thirdness of the diagram and that on the last trichotomy are 55 classes of firstness, 10 of secondness and 1 of thirdness? And what that means?

6 Semiotics and Metaphysics

In the ring representing the dynamical object, there are fifty-five classes of collective signs, ten classes of signs of occurrence and one class of abstractive sign (sign of possibility) (Fig. 7). If the dynamical object is what determines the sign and appears only by mediation of the sign, it might then be the real. Since metaphysics searches for the reality below appearance, the withdrawal of the object appears to be congruent with the goals of metaphysics. To obtain a better understanding of this idea, one has to clarify what reality is in the context of Peirce's philosophy; it is that "which is as it is independently of how we may think it to be" [17, 7.659].

Reality is not the same as existence. Reality is not restricted to a single instance of experience defined as a brute fact but it embraces a temporal dimension allowing the facts to be perceived in their regularity. This is in

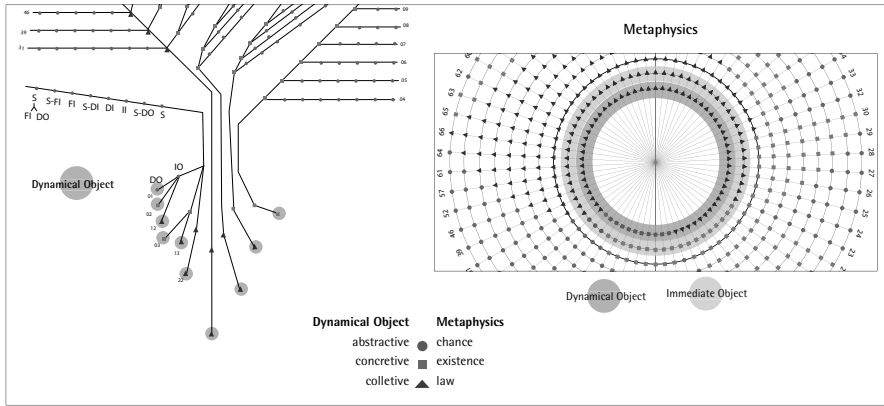


Fig. 7 Metaphysics.

accordance with the realist view that generals are real, and it explains the dominance of the classes of collective signs in reality. The impossibility of having any complete access to reality can be explained by the fact that no particular can express any general.

From these premises follows the conclusion that generals are real, but not that they are existent, for existence is the domain of individuals. It follows that if reality is grounded in the trichotomy of the dynamical object, existence has to be grounded in the trichotomy of the immediate object, for “the immediate object is the object *as it appears* at any point *in* the inquiry or semiosis process” [20]. Thus, the relation between Peircean semiotics and metaphysics is represented in the center of the diagram.

Considering that the phenomenological categories are expressed in Peirce’s metaphysics as chance, existence, and law, and that chance is pure possibility, existence requires occurrence, and law indicates a necessity, it is possible to see the correspondence of these categories with the ones, which Peirce ascribes to the dynamical object. Chance relates to the class of abstractive signs or signs of possibility (red circle); existence relates to signs of occurrence or concretive signs (green squares), and law relates to signs of collection or collective signs (blue triangles).

7 Semiotic and Pragmatism

What happens at the other end seems to be exactly the opposite, since there is predominance of the category of firstness in the classes of signs and only one class expressed by thirdness (Fig. 8). But the detailed analysis of this other side of the diagram will show that there is a fusion between them. Considering that the triadic relation expressed in the last trichotomy is seen as the description of the process of thought, one can inquiry into what the

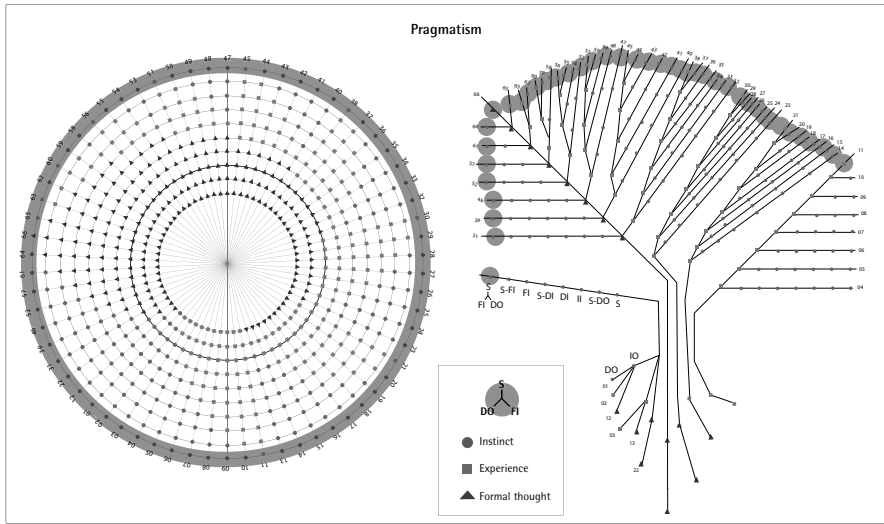


Fig. 8 Pragmatism.

function of thought is as the main goal of pragmatism. Therefore, the passage from the Peircean theory of signs to his pragmatism, or pragmaticism, is represented by the thinnest and most remote branches of this tree. According to Peirce, the ultimate purpose of thought is the development of an idea, rather than action itself.

What is found in the last trichotomy, the one that describes the triadic relation between the sign, its dynamical object and the final interpretant, are thoughts of three kinds: instinct, experience, and form. Of the sixty-six classes of signs, fifty-five are expressed by thinking in the form of instinct, ten by experience and one by formal thought. It seems that the possibility of attaining the pragmatic ideal (concrete reasonableness) is contained in this sole class of signs resulting in formal thought.

The concrete reasonableness considers self-control for the acquisition of new habits. Therefore, it is not strange that this ideal be situated in the only class of signs entirely composed of relations of thirdness, which will be essential in this system. Reason does not lead to complete determination, to a final thought, nor does it lead to any truth as conceived by common-sense. Reason is thought at the level of thirdness and, since semiosis means the creation of ever new signs indefinitely since the final interpretant will always be in the future. A thought of reason must be capable of giving rise to other such thoughts equally capable of the same *ad infinitum*. Reason thus does not point towards any certainty or determined thought, but to the possibility of the creation of thoughts.

As sentiments, pleasure, will, and desire are not self-controlled, reason is the only self-controlled quality, the only that can be freely developed by

human doings. But as an incipient and becoming process, it needs to materialize and embody something. In a process of evolution, ideals do not grow by themselves; existents embody classes of ideals, so that their coming about transforms the very ideals themselves. This means that reason has to congregate existent elements, which make it concrete so that it can be developed. And it is through instinctive thought, understood as habitual thought that thought becomes concrete. Thus, the whole classes of signs work together to the growing of ideas.

I could go further on the relations of semiotics, metaphysics and pragmatism, but since the purpose of this paper is to show how a visual diagram can illuminate many disciplines and not going deep on each topic, next I will show how I started using the diagram for semiotic analysis. For that, instead examining how the classes are manifested in one trichotomy, I examined how the classes pass through the ten trichotomies trying to describe its particular characteristics.

8 Comparison between the Two Classifications

One way to describe the 66 classes of signs is by comparing the ten classes of signs with the 66 classes of signs. The way signs are arranged in the small diagram and the detailed description Peirce gave of the ten classes exemplifies the fundamental logical relations among the sign constituents, and it may serve as a guideline to make the 66 classes diagram more comprehensive.

Since the 66 classes of signs system is an extension of the 10 classes system, which has been deeply discussed and described, the study on the 66 classes begins with a comparison between these two systems (Fig. 9). The first step for the comparison is to identify on the Signtree the 3 trichotomies that compose the 10 classes of sign.

Comparison:

By comparing the two systems of signs we can define 10 well known groups of signs (Fig. 10). All the classes of one group might share qualities that characterize them as being part of the group. The group type is the first characteristic required to start describing the 66 classes. It is a general description, but very useful because it shows the dependence relations among classes and the function of the classes in the semiotic system. To proceed with a semiotic analysis using the Signtree one might know that a sign can have characteristics of the first, the second and the third categories. So, instead of searching for a branch that describes the sign process, one should regard how semiosis follow the branches growing. Semiotic analysis should describe a sign in its most details, for that it is necessary to consider the classes working together, and the meaning of the sign getting more sophisticated as the branches are going higher (that means describing relations of the third category).

The classes of sign describe the conditions of signification. Then, a semiotic analysis should begin describing the most fundamental qualities of the sign

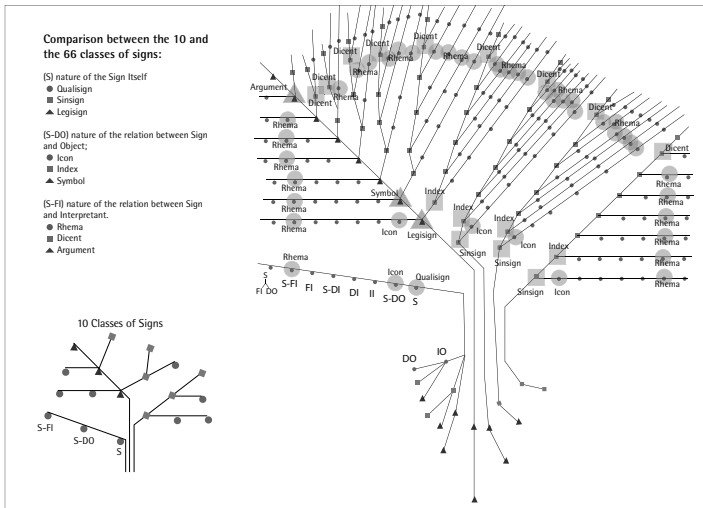


Fig. 9 Comparison between the 10 and the 66 models.

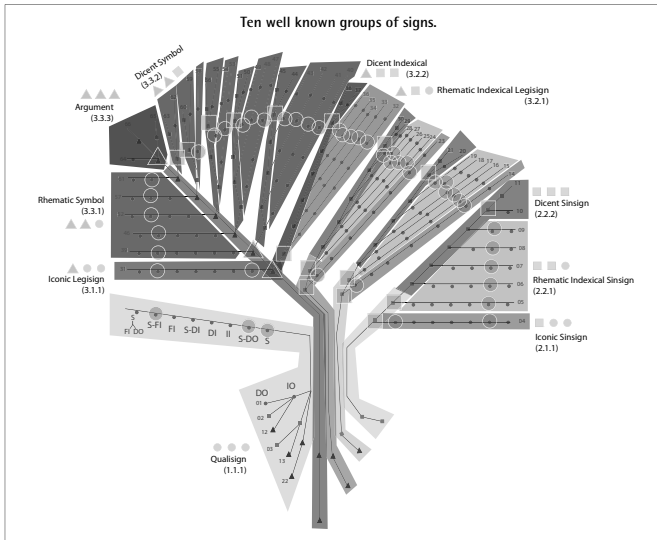


Fig. 10 Groups of signs on the Sigtree model.

(qualisign), which can be only possible qualities and are given in the lowest branch. The next three branches (sinsigns) containing 24 classes describe the existent qualities, facts and instances of law that are present in the sign. Finally, the highest branch (legisign) describes the conventionality of the sign, what rules it.

This highest branch is composed of symbolic classes that are signs of law. They depend on its replicas to express information. The classes that follow from the symbol on the Signtree triadic branch are not concerned with the conditions of the sign to signify, but with the knowledge-producing value, or with its communicative significance.

Then, we can draw some other analogies on this last Signtree branch. Seven classes of signs follow from the symbol bifurcation. They describe the conditions of symbols to signify. Therefore, they concern to *Speculative Grammar*. Relations of firstness that follow on this branch represent the possibility of the symbol to be interpreted, which produces a hypothesis. And relations of secondness following it represents the actual test of predictions based on hypothesis.

The next bifurcations establish the conditions of reaching truth conclusions from a reasoning form (Fig. 11). To determine a valid argument it is necessary to guarantee the validity of its leading principles. "If one can guarantee the validity of a leading principle, then, given true premisses, the conclusion will have a guarantee of being either necessarily or probably true, depending on the type of argument" [17, 2.464]. These last classes of signs seem to be related to the second and third branch of semiotics: *Critical Logic and Methodetic*. The former concerns the accuracy and truth of information, and the latter establishes the formal conditions for attainment of truth.

The branch composed by thirdness on its interpretants concern to the validity of thought. The various twigs with relations of firstness and secondness

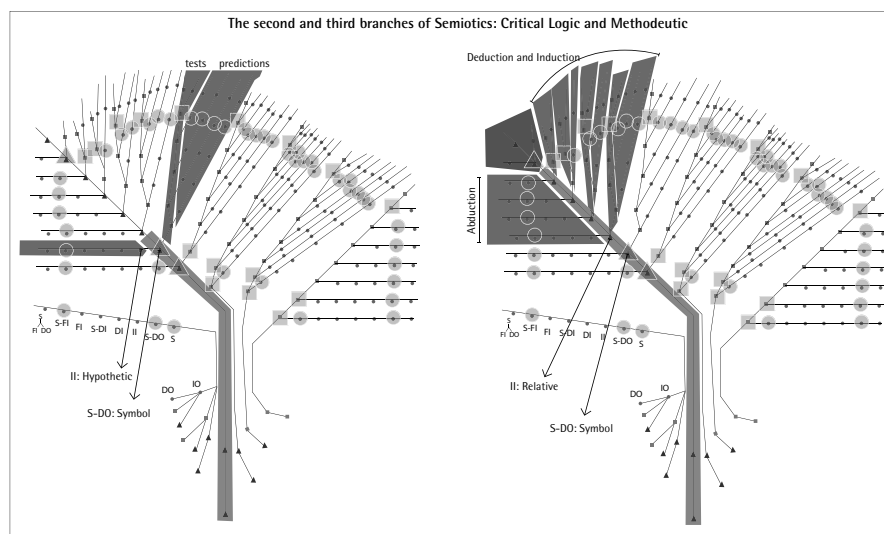


Fig. 11 The second and third branches of Semiotics: Critical Logic and Methodetic.

that follow from the thirdness branch shows that valid reasoning is based on experience. According to Peirce, “deduction proves that something must be, Induction shows that something actually is operative, Abduction merely suggests that something may be” [13, 2.216]. Then, it seems that the classes that have only relations of firstness on the interpretants might be related to abduction. The classes composed by relations of secondness to induction, and the classes composed by relations of firstness and secondness would represent deduction.

9 Final Considerations

Semiotics is not an isolated discipline; it is the ground of Peirce's philosophical framework. The representation of this system in the form of a tree diagram reveals its complexity. Since the growth of the branches of this tree represents the evolution of thought, and the growth of the roots the complexities of reality, the diagram of Peirce's system of thought finds its ground in the tree of knowledge connecting the world of thought with the one of reality. Pragmatism and metaphysics are the sciences whose relevance to the dimensions of the diagram becomes apparent. Besides that, the Sigtree model evinces a semiotic philosophy able to specify its constituents without isolating them in the course of analysis. The concept of continuum is able to integrate all constituents of Peirce's philosophy into a unified framework and the sixty-six classes of signs are a result of Peirce's effort of defining the points of relevance on this continuum.

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