


Iconicity, Hypoiconicity



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Abstract:

Drawing on various aspects of Peirce's philosophy, the article shows how iconicity and hypoiconicity are derived from a logic of the icon postulated in 1906. The first part deals with the nature of this logic, the second with the derivation of the icon, index and symbol, while a third part discusses and illustrates the three hypoicons, image diagram and metaphor, with particular emphasis on the relation between metaphorical form and abductive inference. Some of the implications of iconicity theory for iconology and linguistics are discussed in the conclusion.

Keywords: Icon, Hypoicon, Inference, Image, Diagram, Metaphor

In the course of the twentieth century, the human and social sciences came to be marked by two theories of the sign conceived on opposite sides of the Atlantic. Although they both have their origins in the latter part of the nineteenth century, the European semiology of Saussure can be traced to the three courses in general linguistics given in Geneva in the years between 1906-1911, while the mature period of the semiotic theory of C. S. Peirce can be considered to date from the early years of the century with the manuscript "Syllabus" (c. 1902) and its author's definitive statement concerning the architectonic principle governing the organization and classification of the sciences published in 1903 (cf. CP 1.180-202).¹ We know that both men conjectured that their theories of the sign might one day provide the foundations of a unified view of the humanities. Saussure, for example, saw the arbitrary nature of *la langue* as the paradigm form of representation, and this led him to believe that linguistics would one day serve as the general model of semiological inquiry, while a systematic philosopher like Peirce saw the sign-relation as central to a much broader epistemological concern aimed at producing comprehensive theorems of knowledge and scientific discovery.

The diverse fortunes that the two projects encountered offer a fascinating glimpse into modern western intellectual history, for, as we look back over the century, we are afforded the opportunity, unique in the history of ideas, to examine the parallel development of two contemporary competing conceptions of the sign and its function in the human sciences. Now, of all the concepts that illustrate the considerable theoretical differences separating the two conceptions, one in particular has generated massive critical concern and controversy, namely Peirce's concept of the icon.

Consequently, the present article is intended as a defense and an illustration of the

concept. In what follows I shall set my defense of the principles involved squarely and unregenerately within the field where Peirce intended that discussion of it should take place, namely his logic. I shall then examine what makes iconicity theory not an instrument of difference but rather of similarity, a means of discovering the iconic elements that different types of signs have in common - showing specifically what makes a pictorial sign iconic, and how even the conventional signs of language possess inherently iconic features. As a conclusion I shall present what I see as the major implications of iconicity and the hypoicons for two areas of human inquiry in which their relevance has been a major theoretical issue, namely linguistics and what I shall refer to loosely as "iconology."

1. The Logic of the Icon

This section deals with why the icon as Peirce defined it is incompatible with tasks defined within the narrowly verbocentrist tradition which evolved from the *Cours de linguistique générale*. This will involve showing how iconicity is nested within a complex structure of philosophical, as opposed to linguistic, concepts; how it relates to the structure of inference and Peirce's conception of cognition and scientific activity; finally, how it relates "organically" to, and is therefore inseparable from, the index and the symbol. In short, I wish to show that the principle of iconicity is the logical outcome of a theorematic vision of semiotics, the construct of a veritable logic of the icon.

Just how important Peirce came to see the specific development of a logic of icons can be seen from a fragment entitled "Phaneroscopy, fa{n}" dated 1906. In these few paragraphs, he is concerned with, among other things, the graphic representation of thought and the thought process, and in the course of the discussion considerably extends the traditional scope of logic:

The highest kind of symbol is one which signifies a growth, or self-development, of thought, and it is of that alone that a moving representation is possible; and accordingly, the central problem of logic is to say whether one given thought is truly, i.e., is adapted to be, a development of a given other or not. In other words, it is the critic of arguments. Accordingly, in my early papers I limited logic to the study of this problem. But since then, I have formed the opinion that the proper sphere of any science in a given stage of development of science is the study of such questions as one social group of men can properly devote their lives to answering; and it seems to me that in the present state of our knowledge of signs, the whole doctrine of the classification of signs and of what is essential to a given kind of sign, must be studied by one group of investigators. Therefore, I extend logic to embrace all the necessary principles of semeiotic, and I recognize a logic of icons, and a logic of

indices, as well as a logic of symbols.... (CP 4.9)

There are no doubt innumerable reasons why Peirce should have felt the need to recognize and develop a logic of icons. For example, in view of his opinion that his Existential Graphs were the "moving-picture of thought" (CP 4.8; 4.11) and of his constant appeal to photographs and photography as examples of indexical representation, one must assume that he had been struck by two of the major technological inventions of the previous century: in a discussion of Marx and the *camera obscura* W. J. T. Mitchell, for example, suggests that its immediate realism made photography the "revolutionary medium of the century" (1986, p. 179), but for most people the invention of the kinoscope and moving pictures was probably even more sensational. Whatever the case may have been, Peirce was doubtless acutely aware of the theoretical tensions both media created for a theory of signs with claims to completeness and exhaustivity.

In addition, from a theoretical as opposed to cultural point of view, we note that the text dates from the peak of the most productive period in Peirce's semiotic investigations, namely the years from 1902 to 1906. To begin with, he expanded the number of correlates entering into the "composition" of the sign-relation, defining two objects and three interpretants. Furthermore, he concomitantly developed the dynamic notion of determination and offered richer definitions of the dynamic object, both developments having considerable import for subsequent work in semiotics.

The period also testifies to intense reflection on Peirce's part on the nature of the icon itself, a concept he first introduced in 1885 in an article on the algebra of logic, and in which he replaced the term "likeness" advanced originally in the 1867 text "On a New List of Categories" (CP 1.545-567). Not surprisingly, the most significant statements on the icon, and more importantly on the hypoicons, to be found in the *Collected Papers* (CP 2.274-277) date from the period between 1902 and 1903.

Moreover, it was at this time that he developed at least four different classifications of signs. The first and best known of these is the triadic, "relational" classification (cf. Jappy, 1985) of 1903, described at length in volume 2 of the *Collected Papers* (CP 2.254-264), and yielding ten classes of signs. By 1904 he had produced an initial relational hexadic classification, which is really nothing more than an expansion of the previous one. However, we learn from the draft of a letter to Lady Welby dated 1909 (CP 8.363) that between the summers of 1905 and 1906 he had produced a second, "dynamic" hexadic classification structured by the process of determination and governed by a categorial hierarchy, and had sketched out the divisions of a decadic system, these

classifications yielding respectively twenty-eight and sixty-six classes of signs.

Perhaps the most profound aspect of work in this field, the significance of which remains yet to be fully worked out, was the inclusion of inference in the original classification, for Peirce made the argument, a class of sign which subdivides into induction, deduction and abduction, the most genuine and characteristic sign of all. No doubt the scholar more familiar with Saussure's definition of the sign as the association of a *signifiant* and a *signifié*, and more accustomed to considering words like "tree," "arbor" or "equus" as examples of signs, will find the classification of inference as a sign perplexing to say the least, but this was the case from the 1903 triadic system on. With this decision Peirce did for logic and semiotics what Von Neumann did for the digital computer when he suggested that both data and instruction be formulated in the same code: in 1903 Peirce defined the means of discovery - inference - and the objects of the processes of discovery - signs - as elements of the same semiotic system, and made them subject to the same constraints and definitions.

Thus, although perhaps not immediately apparent, a further reason for developing a logic of icons stemmed from Peirce's career-long belief in the inferential nature of cognition. Indeed, he not only considered all conscious reasoning to be a form of inference, but by the beginning of the century had also concluded that even the unconscious processes of perception were a form of a-critical inference. One consequence of this is that generality, for example, is discernible through the quasi-abductive process of perception, a principle which guarantees our ability to distinguish something that is a sign from something that is not, and which Peirce recorded with epigrammatic panache in the following statement: "The elements of every concept enter into logical thought at the gates of perception and make their exit at the gate of purposive action; and whatever cannot show its passport at both ends is to be arrested as unauthorized by reason" (CP 5.212). Peirce, then, held all knowledge to originate in inference from experience, which he defines as the "cognitive resultant of our past lives."

It follows that the perceptual judgements upon which our knowledge of the world is founded, including our knowledge of language, wine and other people, begin as a-critical inferences from percepts, i.e., from what Peirce calls the "evidence of the senses." These the intellect records as positive, fallible but incorrigible and irreversible perceptual facts (CP 2.140-143). An important corollary follows, too, namely that anything which cannot be perceived, or whose scientific validity cannot be established by experimental conditions, ipso facto can neither be knowable nor known.

Thus since in perception we infer qualities, existents and signs, a truly complete and systematic logic must be capable of dealing not only with the symbols of the Aristotelian tradition but also with the sensations and occurrences encountered in everyday life. It was for this reason, for example, that the discovery of quantification in collaboration with his pupil O. H. Mitchell during the 1880s at Johns Hopkins led to a revised conception of reality and to the development of the logic of indices. It was for much the same reason, it seems to me, that in 1906 Peirce postulated the legitimacy of a hitherto unimagined logic, a logic of icons.

2.

We turn now to the theory of the icon. In order to understand fully the manner in which Peirce derives it, four general aspects of his logic need to be discussed: the architectonic principle, the numerical nature of his categories, the process of abstraction, and his theory of triadic relations.

2.1

Although not itself a feature of the logic, the most convenient starting-point for a review of iconicity theory is to be found in the architectonic principle by which Peirce classified the sciences, for it enables us to comprehend the structural interconnection between the logic of relations, his conception of phenomenology and the categories on which the logic came to be founded. This will enable us to state what can be seen as the first two of the founding principles of iconicity theory and to lay the groundwork for the third, which we shall hold over until the discussion of the hypoicons.

Both in his 1902 submission to the Carnegie Institution and in the course of the Lowell lectures late in 1903, Peirce adopted like Kant before him an "architectonic" or systematic approach to the relations between the different sciences. These Peirce divided into the sciences of discovery, the sciences of review and the practical sciences. The sciences of discovery, namely mathematics, philosophy and the special sciences, are organized in a "presuppositional" manner in which successive groups of sciences depend conceptually upon their predecessors in the scheme: mathematics, which in the final classification contained a logic of mathematics, including a logic of relatives, comes first in the classification and is independent of all the other sciences, whereas philosophy depends upon mathematics. For Peirce, philosophy was a collective term for a group of sciences composed of phenomenology, the normative sciences (which include

logic) and metaphysics, each of which has recourse, or appeals for its principles, to the sciences which precede it in the classification. It is in this way that the categories ultimately constituted the foundations of his logic but were derived from phenomenology, whose relation to mathematics is described in the following manner:

Having thus by observation satisfied ourselves that there are these three categories of elements of phenomena, let us endeavour to analyse the nature of each, and try to find out why there should be these three categories and no others. This reason, when we find it, ought to be interesting to mathematicians; for it will be found to coincide with the most fundamental characteristic of the most universal of the mathematical hypotheses, I mean that of number. (CP 1.421)

The extract shows how Peirce came to conceive of the three "universal" categories of Firstness, Secondness and Thirdness as corresponding respectively in structure to the irreducible forms of the monad, the dyad and the triad. The latter are the categories of the "forms of experience," and are determined by number (CP 1.452). With their disturbingly simple structure and vast scope, the categories constitute for researchers from other fields what is often initially perceived as one of the least congenial and least fashionable features of Peirce's whole philosophy, and with the notable exception of Umberto Eco, most are reluctant to refer to them. Nevertheless, as the architectonic principle seeks to show, they are vital to Peirce's logic, and completely underwrite the discussion of iconicity to follow. What makes it possible to "identify" them so to speak, is the principle of abstraction, or precision, a process originally defined in the article "On a New List of Categories," and which figured prominently in Peirce's methodology in his ensuing research in logic:

Abstraction or precision, therefore supposes a greater separation than discrimination, but a less separation than dissociation. Thus I can discriminate red from blue, space from color, and color from space, but not red from color. I can prescind red from blue, and space from color (as is manifest from the fact that I actually believe that there is an uncolored space between my face and the wall); but I cannot prescind color from space, nor red from color. [...] Precision is not a reciprocal process. It is frequently the case, that, while A cannot be prescinded from B, B can be prescinded from A. (CP 1.549)

Returning to the categories we see that by virtue of the operation of abstraction Firstness can be prescinded from Secondness, but not vice versa. Similarly, Secondness can be prescinded from Thirdness, but not vice versa. More significantly, it follows from the converse of this principle that Thirdness implies both Secondness and Firstness, and that Secondness implies Firstness. Thus, originally given by the relation of representation, by the time of the semiotically creative period at the beginning of the

century, the categories had been derived from the phenomenological component of philosophy and organized in terms of increasing complexity.

A final preliminary and related point concerns Peirce's conception of triadic relations, for these make it possible to define and identify the three relates of the sign-relation. In yet another text dating from the most prolific period of Peirce's semiotic investigations, the relates of triadic relations are termed "representamen," "object" and "interpretant" and, in accordance with the categories, are defined relatively to one another in terms of increasing complexity. The representamen is identified as the first term of the relation in the following manner: "We must distinguish between the First, Second and Third Correlate of any triadic relation. The First Correlate is that one of the three which is regarded of the simplest nature, being a mere possibility if any one of the three is of that nature, and not being a law unless all three are of that nature." (CP 2.235). In like manner, the third relate, the interpretant, is defined as : " ... that one of the three which is regarded as of the most complex nature, being a law if any one of the three is a law, and not being a mere possibility unless all three are of that nature." (CP 2.236). Not surprisingly, the second relate, the object, is defined as "that one of the three which is regarded as of middling complexity..." (CP 2.237).

These definitions call for two remarks. Firstly, it must not be thought that signs are the only examples of triadic relations. Acceleration, for example, is for Peirce yet another "genuine" case, i.e. one involving all three relates in a continuous, indecomposable triadic relation: "Now an acceleration, instead of being like a velocity a relation between two successive positions, is a relation between three." (CP 1.359, c. 1890). Secondly, and this may help to clarify Peirce's seeming hesitation between the two terms, this particular section of the *Collected Papers* ends with the following remark: "A *Sign* is a representamen of which some interpretant is a cognition of a mind. Signs are the only representamens that have been much studied." (CP 2.242). With these points in mind, we turn to the definitions of the sign and their importance for iconicity theory.

2.2

For reasons that should now be obvious, one of the constant features of the numerous definitions of the sign that Peirce produced throughout his philosophical career is the recourse to at least three relates : the function of a sign being representation, that is, an example of Thirdness, the definitions are necessarily triadic, and the relates described by means of the theory of triadic relations outlined above. In addition, the nature of the relation obtaining between the relates becomes particularly important from 1902

onwards, as Peirce fleshes out his conception of the object and with it the manner in which it determines the sign. Consider first the representation of a simple triadic relation, Figure 1, where the relates are set out in order of increasing complexity:

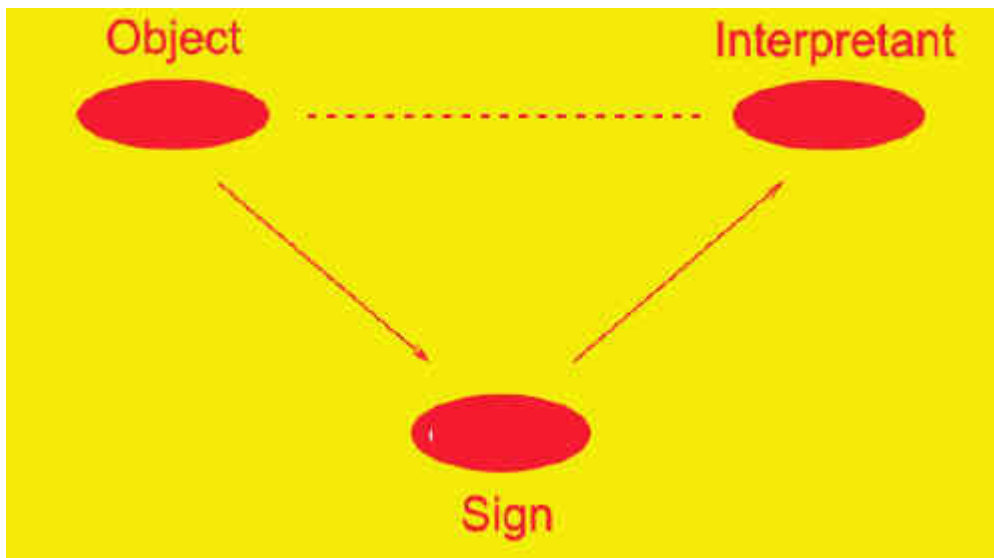
R ———— O ———— I

Fig 1.

The representamen R of the relation is thus a First, the object O a Second and the Interpretant I a Third. Now compare this definition of the sign:

I define a Sign as anything which is so determined by something else, called its Object, and so determines an effect upon a person, which effect I call its Interpretant, that the latter is thereby mediately determined by the former. (SS 80-81, 1908)

This we can represent diagrammatically in the following manner:



The direction of the arrows signifies the logical order of determination, while the dotted line represents the impermissible *immediate* path from the object to the interpretant such as would characterize a mirror-image or stimulus-response conception of cognition. However, since no direct “path” is possible the interpretant can only be a determination of the sign, and the sign a determination of the object, which is how the process of signification involves the interpretant being mediately determined by the object. That this is the only order of determination possible is illustrated by the following anecdote:

There must be an action of the object upon the sign to render the latter true. If a colonel hands a paper to an orderly and says “You will go immediately and deliver this to Captain Hanno” and if the orderly does so, we do not say the colonel told the truth; we say the orderly was obedient, since it

was not the orderly's conduct which determined the colonel to say what he did, but the colonel's speech which determined the orderly's action. (CP 5.554)

As for the nature of the determination that occurs in the course of sign action, Peirce offers the following definition: "Now to determine is to make a thing different from what it would have been otherwise (MS 305)." It follows from this that the object not only brings the sign into existence but it also determines its structure. Just how this principle relates to iconicity theory can be seen from the following definition dating from 1906:

I use the word "*Sign*" in the widest sense for any medium for the communication or extension of a Form (or feature). Being medium, it is determined by something, called its Object, and determines something, called its Interpretant [sic] or Interpretand.[...] In order that a Form may be extended or communicated, it is necessary that it should have been really embodied in a Subject independently of the communication; and it is necessary that there should be another subject in which the same form is embodied only as a consequence of the communication. (SS 196)

In this passage Peirce is explaining to Lady Welby the nature of the relations holding between the relates – which by now have been expanded to include two objects and three interpretants –, and in particular, the nature of the determination of the sign by the object. The interesting point, which constitutes the first major principle of iconicity theory, is that in determining the sign to existence, the object imparts or communicates part of its form to it: in an older sense of the term, we might say that the object *informs* the sign.

Following the Scholastics, Peirce is suggesting here that what is communicated by the object to the sign is pure form.² That this should be the case follows from the principle that the only stable, indivisible category capable of "inhering" in all three relates is Firstness, a situation made clear by the following remark: "Thoughts are neither qualities nor facts. They are not qualities because they can be produced and grow, while a quality is eternal, independent of time and of any realization" (CP 1.420). Several paragraphs later Peirce adds: "Quality is the monadic element of the world." (CP 1.426). This means, then, that Firstness is the only category which cannot be analysed further into less complex constituents, the only category from which, therefore, nothing further can be prescinded. As such it constitutes a sort of phenomenological bedrock exemplified by such properties as quality and form, or the sensations of bitter taste, grainy texture and blackness. However, as we shall see in the discussion of the hypoicons, Firstness is nevertheless subject to further categorial treatment.

2.3

We have seen how Peirce's interest in the classification of signs resulted in the construction of increasingly complex systems. It is a measure of the importance he attributed to the division involving the icon, the index and the symbol that it figured in three of his four major classifications. For example, it constitutes the second division in the triadic system of 1903, in which signs are defined according to the nature of the relation obtaining between the sign and its dynamic object. Here again we find the numerical basis of the categories underwriting the description of the three types of sign:

A regular progression of one, two, three may be remarked in the three orders of signs, Icon, Index, Symbol. The Icon has no dynamical connection with the object it represents; it simply happens that its qualities resemble those of that object, and excite analogous sensations in the mind for which it is a likeness. But it really stands unconnected to them. The index is physically connected with its object; they make an organic pair, but the interpreting mind has nothing to do with this connection, except remarking it, after it is established. The symbol is connected with its object by virtue of the idea of the symbol-using mind, without which no such connection would exist. (CP 2.299)

By definition, then, an icon is a sign (a First) that signifies by virtue of the fact that it shares at least one quality (a Firstness) with the object that determines it: "An Icon is a Representamen whose Representative Quality is a Firstness of it as a First. That is, a quality that it has qua thing renders it fit to be a representamen. Thus, anything is fit to be a Substitute for anything that it is like." (CP 2.276). In other words, when the relation between the sign and its object is one of pure quality, then the sign is an icon, and its characteristic representative quality is to be such as it is, independently of both object and interpretant. To the extent, then, that an entity has at least one quality it is fit to function as a sign, though it cannot do so until it has been so determined by its object and has determined in turn an interpretant. Note that the fact that the representative quality of the icon is, from a categorial point of view, monadic, renders this type of sign not genuine, but doubly degenerate:

An Icon is a sign which refers to the Object that it denotes merely by virtue of characters of its own, and which it possesses, just the same, whether any such Object exists or not... Anything whatever, be it quality, existent individual, or law, is an Icon of anything, in so far as it is like that thing and used as a sign of it. (CP 2.247)

To return to the definition of the sign given above (SS 196), we now see that the communication of a form does not mean a sort of physical transference of one thing to another, though this is the case with a seal impressed in wax, but rather the

appropriateness of one thing standing for another thing by virtue of at least one common quality. Consider, now, the definition of the index:

An Index is a sign which refers to the Object that it denotes by virtue of being really affected by that Object. [...] In so far as the Index is affected by the Object, it necessarily has some Quality in common with the Object, and it is in respect to these that it refers to the Object. It does therefore, involve an Icon, although an Icon of a peculiar kind; and it is not the mere resemblance of its Object, even in these respects which makes it a sign, but it is the actual modification of it by the Object. (CP 2.248)

Whereas in the case of the icon the existence of the object was not a prerequisite for its own particular representative quality - it was simply required to possess at least one quality -, the index is defined precisely by the fact that the object is necessarily involved in its semiotic "constitution" - the interpretant, for example, does not enter into the picture, though indices obviously do not function as such until they determine an interpretant. Since the interpretant is not directly involved in the determination of such signs, the index is a singly degenerate sign.

The important point to note here is the way the principle of precision operates in the case of the index. Whereas nothing can be prescind from an icon - in its pure form it is simple Firstness, the icon can be prescind from an index. Conversely, the definition states, an index involves an icon, albeit "of a peculiar kind." Peirce illustrates the principle in the following manner: "A photograph, for example, not only excites an image, has an appearance, but, owing to its optical connexion with the object, is evidence that that appearance corresponds to a reality." (CP 4.447). In this particular case, the image or appearance is the iconic element involved in the photograph, while the optical connexion is the truly existential determination of the sign.

This raises a recurrent problem in verbocentrist criticism of the concept of the icon, namely the claim that signs do not resemble what they stand for. To see how ill-conceived a remark this is the reader is invited to consider Plate 1., a photograph of an irregular block of basalt to be found in Petroglyph National Monument near Albuquerque, New Mexico. It has three presumably pre-Columbian petroglyphs pecked into its surface:



Unless I, the writer, am utterly mistaken, the signs on the slab of basalt resemble respectively a pair of birds (doves?), an ornate goblet and a star, for this is how I interpret the blend of shapes incised on the rock. The problem then is what do we mean by resemblance? For Peirce, a pair of objects can be said to resemble each other if they have at least one quality in common, resemblance being "... an identity of characters; and this is to say that the mind gathers the resembling ideas together in one conception," (CP 1.365), or, putting the matter perhaps more clearly: "... the hypothesis is that resemblance consists in the identity of a common element" (CP 1.389). In the last resort, what determines whether we think a sign resembles its object is the action we are prepared to undertake on the basis of our interpretation of it (i.e. the sign's dynamic interpretant). For example, after examining Plate 1, and finding it reminiscent of a panel seen in another area, a petroglyph enthusiast might wish to visit the park himself. Alternatively, he might start comparing the panel with photographs in his own collection. In either case, he will have assumed that the panel on Plate 1 looked like, in other words, *resembled*, a group of petroglyphs.

The example illustrates yet another source of confusion which needs to be eliminated before we turn to the discussion of the symbol, one that concerns the nature and function of the referent in the Peircean conception of the sign. Saussure, it will be remembered, had little to say about the sign's referent except that, since it was unmotivated, that is arbitrary with respect to its *signifié*, the *signifiant* had no natural attachment with anything in nature (1916, p. 101). It was Benveniste who subsequently

took up the issue of motivation, stating that the relation between the *signifiant* and *signifié* was motivated, and that what was arbitrary was the relation between the sign and its referent, i.e. the extralinguistic entity the sign represented (1939/1966, p. 51-55). Within Peircean theory, the object of the sign cannot, except in one special and important case of deixis, be identified as the referent, otherwise the slab of basalt and the petroglyphs on it would have been the sole determinants of the existence of the photograph; otherwise, too, taking the process improbably one stage back, we should have to admit not that some long-gone culture inscribed the representations in the basalt, but that the referents of the respective inscriptions did the pecking themselves. This is patently not the case, and the principal determinant – the Aristotelian efficient cause, so to speak – constituting the object of the photograph is the person who took it, namely the photographer, even if, without the rock, the photograph would never have existed in the first place. In like manner, the principal determinant of the object of any utterance, irrespective of its lexical content and grammatical structure, is the speaker, not the utterance's referents.

That Peirce came to see the object as something essentially cognitive is a consequence of the development of his hexadic classification and the way the potential multiplicity of classes of signs is severely constrained by the hierarchy determining the relations between the categories. Consider the following extract from a letter to Lady Welby, dated 1908, in which the terms "Possible" and "Necessitant" can be taken respectively to be Firstness and Thirdness:

It is evident that a possible [sic] can determine nothing but a Possible, it is equally so that a Necessitant can be determined by nothing but a Necessitant. Hence it follows from the Definition of a Sign that [...] the six trichotomies, instead of determining 729 classes of signs, as they would if they were independent, only yield 28 classes. (SS 84)

If the categories were independent of one another, an entity of the category of Firstness would be able to determine, for example, an entity of the category of Thirdness, i.e. cause it to be different from what it would otherwise have been. Such a possibility would result in an intolerable chaos in the universe of signs, and would threaten to interrupt the continuity of sign action. Thus during those prolific years at the beginning of the century, Peirce's definitions of the sign also tend to emphasize the cognitive, inferential nature of semiosis, as we see from the following definition:

Every sign stands for an object independent of itself; but 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. For the sign does not affect the object but is affected by it; so that the object must be able to convey thought, that is, must be of the nature of

a thought or sign. (CP 1.538, 1903)

and, four years later, in a definition which reintroduces the principle by which the object determines (here "moulds") the sign to a sort of conformity with its own structure :

A sign is whatever there may be whose intent is to mediate between an utterer of it and an interpreter of it, both being repositories of thought, or quasi-minds, by conveying a meaning from the former to the latter. We may say that the sign is moulded to the meaning in the quasi-mind that utters it, where it was, virtually at least (i.e. if not in fact, yet the moulding of the sign took place there as if it had been there) already an ingredient of thought. (MS 318, 1907)

Having pre-empted potential criticism of the concept of resemblance, and clarified the nature of a sign's object, we turn, finally, to the symbol. As a sign, the symbol is authentically triadic: in contrast to the differentially degenerate nature of the index and the icon, the symbol is a genuine sign, since all the relates contribute to its representative quality. For a symbol, says Peirce, "is a sign which would lose the character which renders it a sign if there were no interpretant. Such is any utterance of speech which signifies what it does only by virtue of its being understood to have that signification." (CP 2.304). However, the symbol exhibits another important characteristic, which is given by the following definition:

A Symbol is a sign which refers to the Object that it denotes by virtue of a law, usually an association of general ideas, which operates to cause the Symbol to be referring to that Object. It is thus itself a general type or law. [...] As such, it acts through a Replica. [...] Now that which is general has its being in the instances which it will determine. [...] The Symbol will indirectly, through the association or other law, be affected by those instances; and thus the Symbol will involve a sort of Index, although an index of a peculiar kind. (CP 2.249)

We infer from the definition that the principle of precision operates doubly in this particular case: the symbol involves a sort of index, albeit of a peculiar kind; but we already know by definition that the index involves an icon. It is therefore a theorem of the logic of icons that by transitivity the symbol will also involve an icon. Since by definition all signs are either icons, indices or symbols, this theorem posits that symbols such as "words, sentences, books and other conventional signs" (CP. 2.292) are subjected to a two-tiered process of motivation: instantiated in indices, they are in part determined existentially by the speaker/writer; moreover, since they involve iconic elements they share formal properties with their objects. Which is not to say that all such formal properties are readily discernible, for while the iconicity of the photograph in Plate 1 is, even though once removed, relatively conspicuous, the sort of iconicity

involved in symbols is twice removed and is therefore not immediately evident and has to be sought for. Nevertheless, Peirce does offer a possible line of research in the course of the following brief discussion of reasoning:

Reasoning, nay, Logic generally, hinges entirely on forms [...] The arrangements of the words in [a] sentence, for instance, must serve as Icons, in order to show the Forms of the synthesis of the elements of thought. For in precision of speech, Icons can represent nothing but Forms or Feelings [...] No pure Icons represent anything but Forms; no pure Forms are represented by anything but Icons. (CP 4.544)

It was in order to persuade linguists to examine such syntactic phenomena as word and constituent order in language that Roman Jakobson made this vibrant appeal in a pioneering and highly influential article entitled "Quest for the Essence of Language":

Thus Peirce's graphic and palpable idea that "a symbol may have an icon or [let us rewrite this conjunction in an up-to-date style: and/or] an index incorporated into it" opens new, urgent tasks and far-reaching vistas to the science of language. The precepts of this "backwoodsman in semiotic" are fraught with vital consequences for linguistic theory and praxis. The iconic and indexical constituents of verbal symbols have too often remained underestimated or even disregarded; on the other hand, the predominantly symbolic character of language and its consequent cardinal difference from the other, chiefly indexical or iconic, sets of signs likewise await due consideration in modern linguistic methodology. (1965/1971, p. 357-58)

With this theorem in mind we turn to an examination of the specific nature of the iconic elements that can inhere in indices and symbols.

3. The Hypoicons

As with the icon, index and symbol, with which the hypoicons share formal properties, the most convenient starting-point is the definitions. Consider the following general description:

[...] a sign may be iconic, that is, may represent its object mainly by its similarity, no matter what its mode of being. If a substantive be wanted, an iconic representamen may be termed a hypoicon. Any material image, as a painting, is largely conventional in its mode of representation; but in itself, without legend or label it may be called a hypoicon. (CP 2.276)

In this definition, no doubt for pedagogical purposes and emphasizing the material qualities of the sign, Peirce assimilates the hypoicon to a painting without its caption: a picture of Malborough Castle, say, minus the name beneath. After this relatively relaxed start, he returns the reader to the complexities of his logic in the very next paragraph,

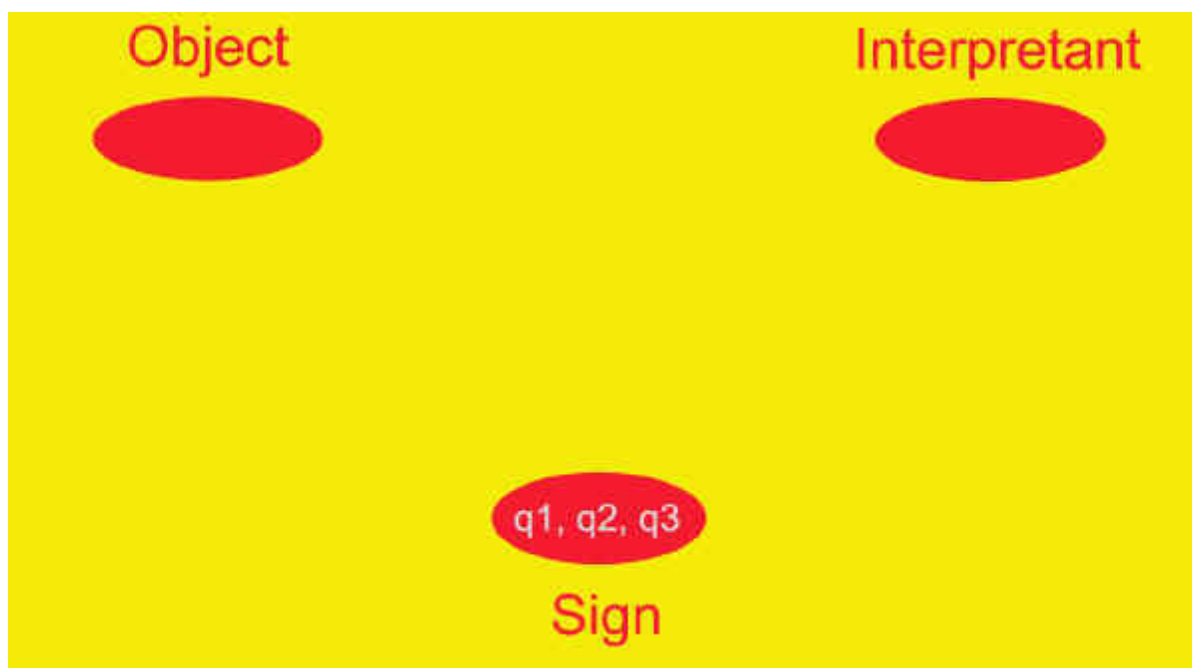
in which he subjects the icon to the now familiar categorial analysis:

Hypoicons may be roughly divided according to the mode of Firstness of which they partake. Those which partake of simple qualities, or First Firstnesses, are *images*; those which represent the relations, mainly dyadic, or so regarded, of the parts of one thing by analogous relations in their own parts, are *diagrams*; those which represent the representative character of a representamen by representing a parallelism in something else, are *metaphors*. (CP 2.277)

It is by means of this terse and uncompromising statement and apparently the only complete definition to be found in the canon, that the Peirce scholar is invited to investigate the nature and function of the hypoicons. Worthy of being carved in stone, the passage records the deduction of the three possible formal configurations characterizing a sign's representative quality, and thus constitutes the third theorem of iconicity: since at different removes both an index and a symbol involve some form of icon, it follows that index and symbol will involve one or other of the three "sub-iconic" configurations defined in paragraph 2.277. In my discussion of the three hypoicons I shall take them in order of increasing complexity, devoting proportionately more energy to the more complex forms. Central to my argument will be the concept of "representative quality," a term I have used before but the discussion of which I have deferred until now. Since we are dealing with forms I shall illustrate them graphically, and it will come as no surprise if the diagrams have a familiar triadic air to them.

3.1

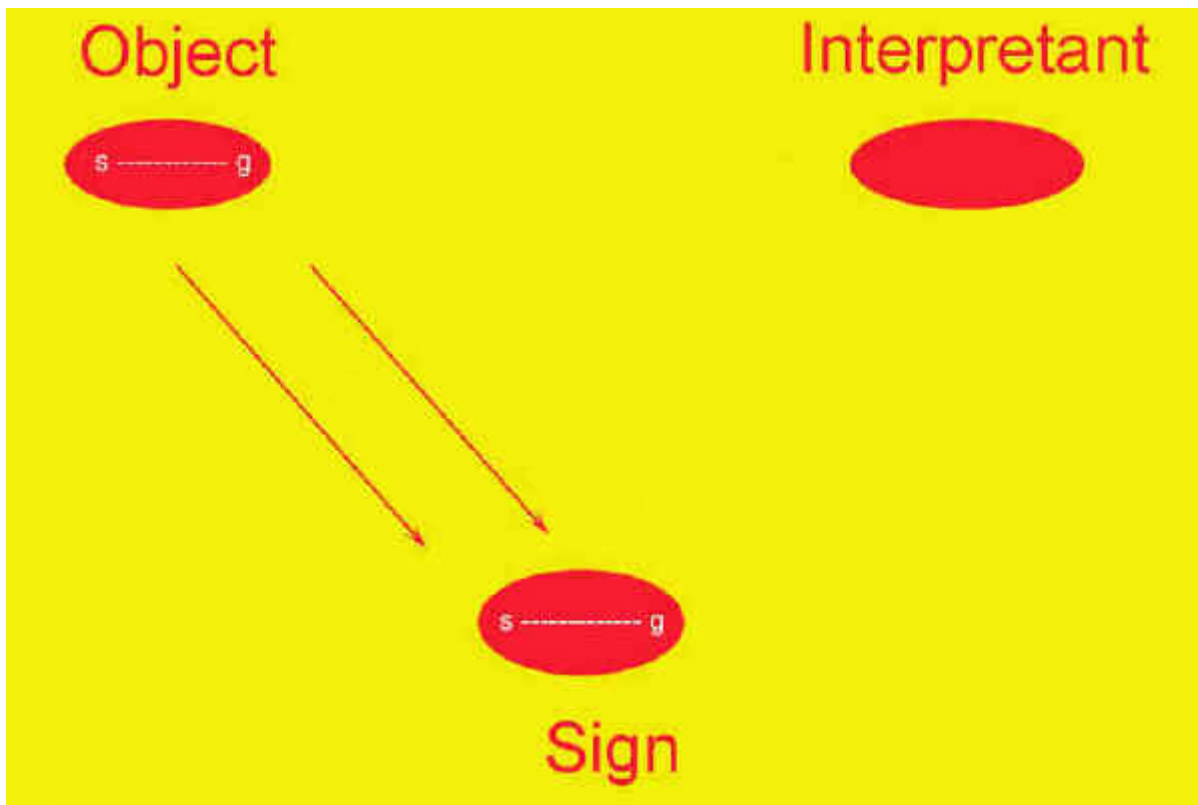
In the terms of the first classificatory system, the image is a pure qualisign, which is a sign that is a simple quality. As such it has no existence, and its presence can only be perceived in some existent object, e.g. the blackness of the basalt rock, or the triangular shapes of points of the star in Plate 1: blackness and triangularity in themselves are sufficient conditions for signhood, but cannot fulfil any such function until determined to do so by some object. How are we to understand the representative quality or character of such a form? The key to the problem is in the reference to First Firstness. Among the hypoicons, the image is monadic and therefore doubly degenerate, whence it follows that a simple quality is sufficient for the sign in which it inheres to function as a sign: qualities are such as they are independently of anything else, a situation which we can illustrate graphically by figuring qualities in the sign, leaving the structure of the object and interpretant unspecified:



Irrespective of the number of qualities present in the object, one in the sign is sufficient for it to function, though on Figure 3 I have indicated three qualities as $q1$, $q2$ and $q3$.

3.2

Consider now the diagram. As in the case of the image, the representative character of the diagram is determined by its relation to the other relates. Whereas to qualify as a hypoicon, the image is independent of both object and interpretant, the representative character of the diagram is its dependence upon the object: its constitution requires that at least two elements associated by some relation in the object should be represented by an analogous dyadic relation in the sign. The nature of this dependence can be illustrated graphically by Figure 4:



The elements on Figure 4 are intended to represent the simple example of the membership relation between an individual s (surgeon) and the class of golfers g , common to both the object and the linguistic sign representing it:

(1) *This surgeon is a golfer*

Given that the relation between sign and object is homomorphic, not isomorphic, there may of course be other dyadic or n-adic relations in the object with no counterparts in the sign.

It was suggested above that the perceptibility of iconicity manifested itself differentially according to whether the sign in which it is involved is iconographic or linguistic. Consider Plate 2, an example of the former type:



Here the designer of the advert has chosen to represent the half-year financial and industrial results of the firm in the form of a bar chart: the profits for two years are compared across three sectors, and are represented as a function of the height of the bars against a background scale. Although relatively abstract in nature, the structure of the illustration is recognizably diagrammatic, and is an appropriate choice for the statistical theme of the campaign.

The iconicity in language signs, on the other hand, is less evident at first sight. One field in which the peculiarly qualitative aspects of speech are open to inspection is sound symbolism. This is an area which continues to receive considerable attention, and to which iconicity theory has contributed a useful conceptual framework. Given the phonic nature of the data, it might be expected that onomatopoeic phenomena, for example, are imagic in nature. However many are revealed to be structurally more complex than initially thought. Consider these lines from Tennyson’s *The Princess*:

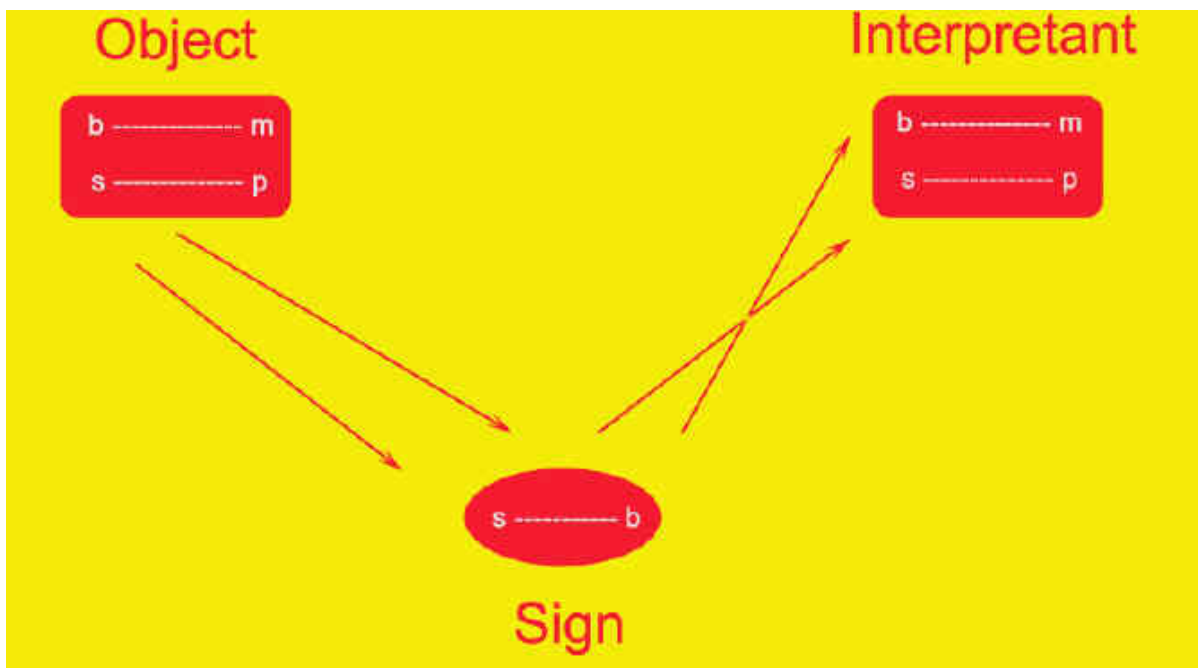
*The moan of doves in immemorial elms
 And the murmuring of innumerable bees*

The cumulative effect of the sequence of nasal /m/ sounds is such as to suggest a humming sound in nature: the words are symbols by definition, but collectively they share the hypoiconic quality of the image. On the other hand, the contrasting vowel sounds found in many diminutives and augmentatives are diagrammatic in structure: the Spanish diminutive suffix *-illo*, for example, contains a stressed close front vowel, produced with a very narrow aperture formed by the tongue relative to the palate; this contrasts sharply with the augmentatives *-acho*, or *-ón*, where the stressed vowels signaling the value are open, generally back vowels produced with a much greater aperture of the vocal tract. It is this correlation between tongue height with respect to the palate and relative "size" (often accompanied by respectively meliorative and pejorative values) that constitutes the diagrammatic structure of the opposition.

Turning from sounds to syntax, we find that the diagrammatic structure in the latter case is far more complex and less immediately apparent: this is the case with the word and constituent order mentioned above, though for reasons outlined below, Peirce's metaphor, ignored by most linguists, may in the end open a more interesting line of research. In any case, a thorough review of work in linguistics conducted by various researchers within the iconicity movement is obviously beyond the scope of the present article, but the interested reader is referred, for example, to the collections of articles in Haiman (1985) and Simone (1995), and to Jappy (1999), in which developments after the publication of Jakobson's article mentioned above are examined in some detail.

We now turn to the last and by far the most interesting of the hypoicons, metaphor, though one which, with notable exceptions, e.g. Anderson (1985) and Haley (1988), seems to have discouraged comment and exegesis. The cryptic wording of the definition tells us that the hypoiconic properties of metaphor are such as to "represent the representative character of a representamen by representing a parallelism in something else," and it is the implications of this definition that I want to attempt to explain.

The first, vital, point to be made is that for Peirce, metaphor is form, not a piece of figurative discourse such as a sentence, although a sentence may be (hypoiconically) metaphoric, for, being qualitative in nature, there is no theoretical limit to the types of signs in which metaphor can inhere. In what follows I shall attempt to show the importance of the reference to a parallelism and its relation to the characteristic underdetermination of signs informed by metaphor. But first, I should like to illustrate the nature of metaphorical form on Figure 5:



Reasoning from the categories, we see that metaphor is a Third Firstness, and therefore the genuine hypoicon of the three, requiring like the symbol, for reasons which will become apparent, the necessary involvement of the interpretant in its constitution. Whereas in the image the structure of object and interpretant were left unspecified, in the diagram it was the structure of the interpretant that was left unspecified. In the case of the metaphor the parallelism to be found in the object, must, if the sign is interpreted correctly, structure the interpretant too. The sign with which they are involved on Figure 5 is the following utterance, an often quoted example of metaphor from blend literature (e.g. Grady et al., forthcoming):

(1) *This surgeon is a butcher*

Now, if we compare them, we find that from a strictly syntactic point of view, utterances (1) and (2) are identical in structure : N1 is N2. However, (1) is an example of a simple diagram, while (2), on the other hand, is metaphorical, and establishes a parallel between a "base domain" in which figures the class of butchers, who, by definition, cut up meat and saw bones, and the target domain, the one the speaker wishes to characterize or pass judgement upon, in which we have an incompetent surgeon who treats his patients as though they were lumps of meat and bone.

This is the situation I have attempted to represent on Figure 5, in which the letters *b* and *m* represent the classes associated by the relation of inclusion in the base domain, and *s* and *p* represent respectively the surgeon and patient in the target domain. But note that whereas the parallelism is evident in the object and the interpretant -

assuming the judgement to have been correctly interpreted -, the sign, e.g. utterance (2), is underspecified with respect to the notions of "meat," "patient" and indeed "incompetence," etc., which have to be inferred from relatively impoverished data.

One consequence of such underspecification is, as we have seen, that metaphorical representations, both linguistic and non-linguistic (e.g. pictorial), are formally indistinguishable from literal, "diagrammatic" representations, a situation which led scholars of an earlier tradition to qualify metaphor as anomalous, deviant and even a violation of basic linguistic principles.

It seems to me that the explanation is in the fact that metaphorical form in the Peircean sense is genuine from a categorial point of view, a property it shares with symbols, and of course, with the most genuine sign of all, the argument. To understand the importance of this, consider the following examples of arguments, adapted from paragraphs 2. 619-625. The first is a case of deduction, where the conclusion is a result:

rule	<i>All the books in my study come from England</i>
case	<i>These books are in my study</i>
result	<i>These books come from England</i>

The second is a case of induction, where the conclusion is a rule:

case	<i>These books are in my study</i>
result	<i>These books come from England</i>
rule	<i>All the books in my study come from England</i>

The final case is abduction, where the conclusion is a case:

rule	<i>All the books in my study come from England</i>
result	<i>These books come from England</i>
case	<i>These books are in my study</i>

Close inspection shows that in each case the conclusion is underspecified with respect to elements in the two premises. For example, in the case of deduction, it is the reference to "my study" which is missing from the conclusion. In the induction, it is the reference to the individuality of the elements involved which is absent, while in case of abduction both the reference to "come from England" and the explicit quantification in the rule are absent from the conclusion. This is because the hypoiconicity of the

syllogism and other forms of inference is metaphorical in the Peircean sense, and the structure of Figure 5, with the two premises as the base and target domains, is a sort of blueprint for cognition and the formation of judicative inferences. As a representation, metaphorical form is, of course, far less complex than the Existential Graphs, Peirce's "moving-picture of thought," but it has the advantage in one area: it is able to represent the structure of inference and metaphorical utterances in the conventional, figurative, non-Peircean sense, a property not shared by the Graphs.

We see, then, that there is a formal structure common to both metaphorical representation and modes of inference, abductive inference in particular, and the iconic nature of abductive inference naturally suggests the classification of metaphorical representations as a form of abduction. In other words, there is really little difference between example (2) above, which presupposes a rule concerning butchers and meat, and the conclusion of the abduction concerning the books: both are the product of premises forming a parallelism. Just why it is that both (2) and the three types of inference are underspecified with respect to elements in their premises is a matter that we turn to now.

To understand the problem, we resort once more to the categories. All forms of communication must, unless we have the gift of telepathy, be channeled so to speak through an existential medium (Secondness). Were this not the case, the waves and troughs of air that carry our voices could not be formed, and parchments, the written page and the computer screen would never have been invented. The signs of language are vectorial, and therefore unidimensional in nature. However, in the utterance *This surgeon is a butcher*, the structure of the object that such a unilinear sign is recruited to represent is, on the other hand, far more complex - a parallelism at least, according to the definition. In other words, in the case of metaphorical hypoiconicity, the sign has to represent an object far more complex than itself, and in the process information is lost.

But we know that generality is perceptible, that we recognize a sign from something that is not one. In similar fashion, we learn through experience to recognize the generality characteristic of metaphorical expressions, often from highly underspecified data, highly impoverished data in many instances - innuendo, scurrilous blues songs, parables, fables, allegory and even political speeches all exploit the possibilities for dissimulation offered by metaphor. And lest it be thought that this is simply because language signs are unidimensional, consider the following advertisement for Posner cosmetics: we find that the same underspecification is a characteristic of the metaphorical mode of two-dimensional pictorial signs:



We are presented with the improbable sight of a sophisticated young woman leaning on the ropes of a boxing ring holding a glass of champagne as a sign of victory. Behind her stands a boxer with his head bowed and a towel round his shoulders, signs of submission. Given that the young woman's make-up figures prominently in the foreground, the varnish on her fingernails in particular, for these are the counterparts of the boxer's gloves, we are to infer that it is because she has chosen this brand of cosmetics that she has been successful in this particular episode in the battle of the sexes. The message of the advertisement is that for a woman to appear in society without a man in tow would be socially unacceptable, hence the need for a powerful and resistant brand of cosmetics to bring the chosen man to heel.

Note that formally the illustration is no different from a photograph of two boxers. Nevertheless, the incongruity we are supposed to notice comes from the fact that there are two situations fused in one, and that there are elements of each situation that have been omitted: the illustration is underspecified. The advert presents woman's perpetual social predicament in the terms of a boxing match, from which the woman's male

partner and the winning boxer are absent: we have to infer the relation from the information supplied. Note, too, that if the missing protagonists were in fact to be featured in the illustration, the advertisement would in this case be a simile, and diagrammatic in structure. Thus, in spite of having an "extra" dimension, metaphorical pictorial signs likewise cannot be represented other than in an existential medium, and are consequently constrained by the same sort of underspecification as linguistic signs.

4. Implications

The three increasingly complex formal configurations discussed in the previous section have the following implications at least for the two fields mentioned in the introduction, namely iconology and linguistics, and a more general one for semiotics.

In the case of iconology, the principle whereby complex symbols such as utterances, poems, plays and novels should realize one or other of the three hypoicons invites us to review the conclusions of an old debate, namely the relation between words and images. If it is true that analysis can bring out the iconic features of an apparently conventional text, then iconicity refutes the rigid distinction advanced by Lessing in *Laocoön* (1766/1962). This claims in substance that images and texts (respectively painting and poetry in Lessing's case) belong to two distinct semiotic worlds, since by Lessing's definition the first inscribe immutable bodies in space and the second inscribe actions in sequence (1962, p. 78). Poor Lessing - little did he know at the time that about a century and a quarter later a certain Thomas Alva Edison would scotch his first principle irrevocably. Although it would be incorrect to identify iconicity with pictorial signs (taste, touch and the sense of smell are theoretically informed by the same qualitative possibilities), clearly the formal configurations described above bring out similarities between texts and images, and enable us to envisage the demise of binarism as a principle and a methodology (as propounded by the late Nelson Goodman (1976) for example).

For linguistics the lessons of iconicity theory are threefold. Firstly, if as Peirce claims, we can only know what we perceive, and we have seen that generality is perceptible, as is the form inherent in photographs, mass images and utterances, then theories of language which appeal to underlying structure or to underlying constructs like Saussure's *langue*, are, if not vacuous, at least misguided. Moreover, the idea that such structure and constructs constitute an ideal state of language, waiting to be discovered by intelligent linguists, is undermined by Peirce's insistence that cognitive development, including learning a language, is founded on inference, not on some pre-existent

language acquisition device or innate disposition. Similarly, the principle according to which there are three elements involved in the sign process discredits the idea of a language being a pre-established code or a binary system of sound-meaning correspondences.

Secondly, Peirce's bold identification of metaphor as a form is justified by what we know of the process of grammaticalization, whereby languages continually produce new grammatical material from what are generally lexical sources. Being insubstantial, metaphorical form cannot evolve "upwards" to the function of indication involved in the grammaticalization process. That no language in the world appears to have grammaticalized either metaphor or irony, another qualitative property of signs, suggests that Peirce's decision was correct, and if metaphor is involved in the grammaticalization process, it is as the formal basis of abductive inference by virtue of which, presumably, speakers reanalyze linguistic forms.

Finally, it seems to me that the underspecification of metaphorical expressions suggests that research into the diagrammatic structure of language and linguistic signs undertaken by many linguists may be underestimating the inferential faculties that speakers bring to bear on what is often impoverished and seemingly disjointed data (as any linguist who has examined corpora of spontaneous speech can testify), and even when the expressions are well formed, it is possible that their semantic content is insufficient to ensure correct understanding of the communication in which such expressions are employed. Since most linguists spend considerable time examining their own language or one they know well, the underspecification we find in metaphorical expressions may well be quite extensive and nevertheless go undetected.

For semiotics, the lessons are potentially more disturbing. Peirce's assimilation of the Existential Graphs to a movie of thought is a pregnant metaphor, and strongly suggests that the theory of icons was in part stimulated by those two late chemical-based, light-reflected technologies of the graphosphere - the photograph and the moving picture. But if we are to believe the mediologist (Debray, 1992), photography and cinema together with the discourses that evolved during the twentieth century to describe and define them - iconicity theory and Saussure-based structuralism, for example - are but the late and final convulsions of a vision of images soon to be relegated to the museum. Peirce's constant referral to photographic examples in his discussions of diagrammatic signs, and Deleuze's adoption of a form of iconicity theory into the theory of cinema are ample proof that the principles of iconicity theory should be sufficient to circumscribe, redefine and render more comprehensible the esthetic universe charted by Lessing, a

universe of representation. But how appropriate will they turn out be to our understanding and intellectual mastery of the world of the electron beam and the digital computer that herald the age of the videosphere, a model-independent universe of simulation?

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Endnotes

1. As is customary in Peirce scholarship, the references to the Collected Papers are indicated as CP followed by the volume and paragraph numbers. References to the correspondence with Lady Welby are indicated as SS plus the page number of the Hardwick edition, while MS refers, of course, to a manuscript. I have included in the bibliography the URL of Joseph Ransdell's pioneering web posting "On Peirce's Conception of the Iconic Sign," which the interested reader is urged to consult. ↵
2. Cf. 'The meaning of a word, its "*forma*" (i.e. what constitutes the word) was described as the relation which holds between the word and the object signified. This relation is caused by the intellect and thus reflects or consignifies the concept which the intellect forms of the object. The meaning contains two components: the significatum and the consignificatum. They are attributed to the word through two consecutive impositions.' Pinborg (1976: 256) ↵