The multidimensionality of semiosis: beyond multimodality

A multidimensionalidade da semiose: além da multimodalidade

Javier Clavere*

Abstract: This essay attempts to continue and expand the conversation based on the concept of anthroposemiosis, as the study of actions of signs as it relates to our species, with particular attention to the concept of multimodality, or the pluralistic enterprise combining multiple signification strands or mediums into a larger analysis of the semiosis enterprise. In the last decade or so, multimodality has provided a much-needed framework for the analysis of the multiplicity of modes, a multipurpose toolkit. This essay will attempt to frame these processes belonging to a larger process, of what can be perceived as multi-dimensional semiosis. By this typology, the modalities or modes are not independent of the process of signification to create a whole, neither are they independent processes that interact with each other, but rather, they are part of a larger symbiotic system of signification.

Keywords: Anthroposemiosis. Multimodality. Semiosis. Semiotics.

Resumo: *Este ensaio busca dar continuidade e expandir o diálogo baseado no conceito de antropossemiose, como o estudo das ações dos signos conforme relacionado à nossa espécie, com atenção especial ao conceito de multimodalidade, ou a iniciativa pluralística que combina as vertentes de significações múltiplas ou medianas em uma análise ampla da iniciativa da semiose. Nas últimas décadas, a multimodalidade forneceu uma estrutura tão necessária para a análise da multiplicidade de modos, um conjunto de ferramentas multipropósito. Este ensaio buscará estruturar esses processos pertencentes a um processo amplo, daquilo que pode ser percebido como semiose multidimensional. Por esta tipologia, as modalidades ou modos não são independentes do processo de significação para criar um todo, nem são processos independentes que interagem entre si, mas, em vez disso, são partes de um sistema simbiótico amplo de significação.*

Palavras-chave: *Antropossemiose. Multimodalidade. Semiose. Semiótica.*

Data de recebimento:18/05/2020
Data de aceite: 02/06/2020
DOI: 10.23925/2316-5278.2020v21i1p34-44

This essay intends to address questions regarding the complex action of signs as we enter the realms of a logic for the future, a new semiosis of sorts. A rising

* Associate Professor of Music at Berea College, USA. Email: javierclavere@gmail.com.

era of human understanding is thrusting itself toward us at an unprecedented speed changing the parameters of what we consider normal or natural. Logic and deductive reasoning have functioned as fundamental pillars in our understanding of the world, but these realities have lost their relevance, and we as semioticians face the daunting task of reclaiming reason. In an age of alternative facts and truth not being truth anymore,[1] the semiotic enterprise seems to have gone bonkers without an explanation for such disarray. What once was a logical mapping of inferential processes and mental operations guided by logic in the pursuit of truth, is now a gameplay of unconscious inferences crossing all borders and limits of signification. It is this domain of signification which is in desperate need of consideration. The world finds itself in the midst of a catastrophic pandemic known as COVID-19. This virus brought continents and cultures to a halt and forced our modern world to abruptly adopt new ways of information and signification processes in the digital world. The topic of this article became, unbeknown to me a couple of months ago, relevant and seriously pertinent. It is my hope that this essay will start a dialogue, maybe encourage new research, and hopefully open the imagination to a new understanding of sign classes, which have grown and mutated in the last decades into a new paradigm of signification, a new multidimensional semiosis.

Tony Jappy's book on the analysis of Peirce's classes of signs, already points to two influential voices in the world of semiotics. Nathan Hauser who in his volume, *The essential Peirce,* volume I, states Peirce was unable to complete the classification of the sixty-six signs within his general theory setting out the stage of possibilities for future semioticians:

> Perhaps in our present state of understanding of language and semiosis we have no need for such complexity [sixty-six classes of signs]—just as we once had no need for relativity physics—but where principal distinctions can be made, they should be made, and, in any case, they will probably someday be needed (1992, xxxviii apud JAPPY, 2017, p. 1).

We, devotees of Peircean thought, ought to take the challenge and look for the windows of opportunity offered in these changing times. However, it is Thomas Short who offers the most compelling and reassuring statement for this enterprise and validates the goal of this essay. Short states:

> For all the enthusiasm that Peirce's later taxonomy has elicited, with its promise of a vast system, and endlessly ramifying formal structures that applies everywhere and to everything, close examination of it disappoints. It is sketchy, tentative, and, at best I can make out, incoherent. Its importance lies not in what it contains but in the kind of project it defines. That project has not been adopted by any of Peirce's devotees (2007, p. 259-260 apud JAPPY, 2017, p. 3).

1 New York City Ex-Mayor and President's Trump attorney, Rudy Giuliani, "Truth Isn't Truth" on Meet the Press, NBC News, August 19, 2018.

It is within the confines of the brilliancy of the class sign classification, where a reading with new technological lenses for twenty-first century signification processes is required. What was once unthinkable, tentative, and sketchy in wireless technology at the beginning of the twentieth century, is now the main backbone of our communicational existence today. What seems sketchy and tentative with twentieth century technological readings in sign signification, will be the backbone to understand the logic of the future (already today).

This research started after two coincidental happenings. The first is related to my efforts in creating a new program of studies in music production and sound design-engineering at my home institution at Berea College. During the last four years, while researching pedagogies to teach the required courses, I began noticing patterns that align with similar characteristics as observed in the development of sign classes by Charles Sanders Peirce. Initially, I dismissed the issue as a coincidence that could easily be explained, without considering the possibilities further. The second occurrence is related to my research interest in modeling systems and multimodality. As a semiotician who delves into musical analysis, multimodality provides the most accommodating methodology to contain the processes of signification within my formal argumentations. The combination of these two elements conjoined, allowing me to construct a parallelism that could be adapted to the semiotic enterprise. The result—the idea that technological advancement affected the perception of musical cognition and understanding—was revelatory. Could this also be applied to semiotics? A question by John Deely came to mind:

> Will semiotics continue modern philosophy's obsession with method or will [it] establish its theoretical framework with sufficient richness and flexibility to accommodate itself to the full range of signifying phenomena [?] Will Semiotics, in other words, develop the full variety and flexibility of methods that an eventual understanding of these phenomena will evoke? (DEELY, 1990, p. 9).

While these words were written in 1990, they resonate more relevant today. I decided to attempt to form a parallel observation of both music technologies and the sign classes development found in Peirce's writings. I set out to compare how earlier technologies affected the perception of sound objects. Would Peirce's theory of sign classification need a technological upgrade? Would the process of sign action change? Unfortunately, I could not find an app at the Apple store to solve this riddle, therefore other steps were necessary.

In the last two decades or so, multimodality has provided a much-needed framework for the analysis of the multiplicity of modes, a multipurpose toolkit. The concept of multimodality, or the pluralistic enterprise combining multiple signification strands or mediums into a larger analysis of the semiosis enterprise has gained an important presence as a valid methodological semiotic enquiry. I postulate that these processes belong to a larger process, of what can be designated as multi-dimensional semiosis. By this new typology, the modalities or modes are not independent of the process of signification to create a whole, neither are they independent processes that interact with each other, but rather, they are part of

a larger symbiotic system of signification in the complex action paradigm of sign class systems.

The examination regarding methods in the semiotic inquiry points to the need of articulating a primordial question: What is semiosis? The process of semiosis is understood to be the action of signs, what in philosophical studies is known as the various types of investigation in causality. One of the earlier attempts to systematize the foundations of semiotic investigation started with a Portuguese Dominican friar named John of St. Thomas, or John Poinsot. In his *Tractatus de Signis* (1632), Poinsot set out to systematize the foundations for a semiotic inquiry. Poinsot raised the question of the relational attributes of the sign, setting the stage of inquiry around the sign-to-mind or sign-to-object relation. Later, we continue the tradition of investigating the sign relation to empiricist and English philosopher John Locke, culminating with American philosopher Charles Sanders Peirce. This line of thought sees semiosis as a

> […] broader and fundamental process, involving the physical universe itself in human semiosis, and making of semiosis in our species a part of semiosis in nature. (DEELY, 1990, p. 6) [and] It is in the tradition of Poinsot, Locke, and Peirce that logic becomes semiotic, able to assimilate the whole of epistemology and the whole of philosophy as well. (DEELY, 1990, p. 31).

Following the legacy of Peirce through Thomas Sebeok, John Deely advanced the concept of Anthroposemiosis. He defined it accordingly:

> All of the sign processes that human beings are directly involved in, and, looked at another way, names those sign processes which are species-specifically human […]. It is the most complex form of semiosis not because it harbors unique modes of semiosis, beginning with language, but because, in addition to harboring unique developments, it harbors at the same time all the other semiosic developments as well and depends upon them in achieving whatever is unique and specific to itself (DEELY, 1990, p. 28).

On the premise that "anthroposemiosis"—which is the process of including all human involvement—is providing the subject matter for semiotic inquiry, anthroposemiosis postulates the framework and foundation for the process of inquiry on the whole human knowledge. As Victor Hugo stated, "Music expresses that which cannot be put into words and that which cannot remain silent." Music is uniquely a human experience, and like our ability to reason, it is an outgrowth of our human evolution. Music is the communication channel where we can reach social contact and it allows for unique emotional expressions. It is linked with the ability of learning and cognition, at the core of human capabilities. With this knowledge, I will utilize a musical metaphorical parallelism to address the development of sign schema, providing indications of the multi-dimensionality of the signs. In addition, I will draw on the ability of signs and music to be performative, adaptive, and dynamic,

in the sense that, like living organisms, they are able to grow, mutate, and change over time.

One major human achievement is the ability to duplicate audio, more specifically a musical performance, in the form of an audio recording-reproduction. Through the development of audio-music technology, sound waves were duplicated and stored in order to be reproduced by mechanical form at a later time. This outstanding discovery changed the course of music production and performance forever creating a new set of possibilities. For the first time in human history, we were able to capture sound, contain it, and reproduce it at will. The immaterial become material, and by this modification sound became an object that is now controllable and containable, and by result, manipulable. Concurrently, this discovery also brought forward the awareness of sound quality in the reproduction state, exposing the primitive character of the technology to record sound and its reproduction in relation to the actual live performance. While this new technology revealed qualities and characteristics in the sound waves, unknown and inaccessible prior to advancements in recording or reproduction of sound technology, there was a long path of development ahead. The important point is that these characteristics in the sound waves which were fundamental in the production of sound, were not absent, or non-existent; they were simply not yet in the cognitive awareness of the time.

In 1885, Peirce first published, in the *American Journal of Mathematics*, his "[…] modern logic and the philosophy of logic and the theory of notation. […] This is the first published account of his icon-symbol-index trichotomy and its application of his theory of signs to his algebraic logic" (EP 1:225). In this published account Peirce describes the relations between the sign and the object. In 1894, Charles Sanders Peirce provides a greater description of signs based on his analysis of conscious experience based on three universal categories. He outlines the three types of signs—icons, indexes, and symbols—providing a background and relationship between logic and semiotics (EP 2:4). While these explanations of sign trichotomy are simple and even questionable as a full system of sign typology, it was the first step toward an awareness and expansion of sign action.

I compare Peirce's attempt of describing the sign with the creation of the mono-aural recordings and sound reproduction. At the same time Peirce was postulating his early accounts of sign classes, in audio technology, inventors were experimenting with the idea of recording and reproducing sound. It was Thomas Edison who in 1877, engraved in a cylinder the words "Mary Had a Little Lamb" in tinfoil. It was not until 1888 that Edison entered the market with a phonograph. The method of recording was mono-aural, allowing one channel to record and reproduce sound. All sound was compressed through this one channel, creating a specific type of sound with limited frequency range. It was not until 1957 that stereo recordings entered the market.[2]

Like the system of trichotomies, the mono-aural audio representation was primitive and basic in the re-construction of real sound. The frequencies of sound were heard coming from one channel as they were placed in one position with a smaller frequency range. The quality of the sound was less realistic, leaving out details and subtle characteristics that were part of the original sound. If a recording

2 Available at www.edisonmuseum.org.

of a symphonic work was done in mono recording, many of the timbres and sound qualities of the ensemble were lost in the range of frequencies.

Similarly, Peirce's understanding of sign classes through these three trichotomies (icon-index-symbol), mirroring the technological shortcomings of the mono-aural recording, left out many of the characteristics and understandings of the sign that were part of the process of semiosis. Given the sign classification, the technological-technical competence to provide a "method for the discovery of methods" lacked the complexities to topologize the sign classes. Like its twin, the mono-aural recording technology, the cognitive awareness was not yet made available through technological advancement (EP 1:228).

A new development in sign classification took place in 1903. Peirce introduced, in his well-known essay,[3] "*Nomenclature and Divisions of Triadic Relations as Far as They Are Determined,*" a third semiotic trichotomy, providing ten classes of signs, and a much more complex system of understanding of sign classification. In this classification, he explains his divisions of arguments, into deductions, inductions, and abductions, the division of deduction into two types, and induction into three types, reconsidering the theory of prepositions (EP 2:289). The scope of the presentation is augmented considerably, with a sense of completeness in addressing a larger network of signification, including what was perceived as an exhaustive classification of signs. According to this new awareness and technology in the method of inquiry, a new paradigm for a combination of sign types was designed, promising completeness and complexity to address the different types of signs. According to Peirce, the three trichotomies of signs result into *Ten Classes of Signs* (EP 2:294). These types of sign names derived from the combination of the interpretant-object-sign-vehicle which created the first level of complexity and combinatoriality. These relations contained triadic relations of comparisons which are those of the nature of logical possibility; triadic relations of performance which are those of the nature of actual facts, and finally the triadic relations of thought which are those of natural laws.

Similar to this new sign class type typology, a new emergence in sound reproduction took place in the mid twentieth century: the creation of stereophonic sound recording and reproduction. The new technique had the capacity to reproduce the effect of sound coming from different directions creating the illusion of a multi-directional, audible perspective. This was intended to imitate the capacity of humans to hear from both ears and process sound independently from each ear.[4]

The most important aspect of stereo recording is the addition of a second channel, and two independent speaker-channels in the reproduction. This addition replicated the binary processing of our bodies and created the impression of what could be called natural hearing, or, in other words, the normal human hearing process. The most important gain in the new stereo technology was the increase of fidelity in relationship with the sound source. Now performances on the stage were represented with greater levels of accuracy, with techniques such as wave recordings at different times where the delivery of each channel imitates the brain's

3 See Fifth section of 1903 *Syllabus* CP 2.233-272.

4 Grove Music Online is available at http://www. https://www.oxfordmusiconline.com/grovemusic/

processing of sound sources to calculate the positioning of the sound source. The technical use of the term "true stereo" refers to the accuracy of the triangulation imitating the sound position of a live performance. Once again both technologies (sound production and the semiosis process) advanced in technological prowess, being able to decipher and provide understanding of elements that were previously unknown, but present, in earlier processes. We can see an increase in the awareness of characteristics due to technological advancement.

The later development in Peirce's sign classification finds a system of 28 sign classes in the Excerpts from Letters to Lady Welby (EP 2:477). It is important to note that there is minimal indication regarding this system by Peirce, pointing to the reality that the system became more complicated and difficult to navigate. Moving toward the complex concept of signs in the 66 sign classes, the signification network became highly convoluted. In this classification Peirce describes and divides the object in two: the dynamic object and the immediate object; the division of the interpretant (dynamic interpretant, immediate interpretant, final interpretant). Finally, with ten elements of sign type (EP 2:483-491), there are the additional interpretants of the "emotional," the "energetic," and the "logical" interpretant (EP 2:409). Given the intricacy of this new classification, the types of signs and sign classes are exponentially complex. While it is certainly a powerful tool for inquiry, the system has proven to lead to more misunderstanding and less clarification, particularly for application. As Nathan Houser pointed out in his keynote speech

> [e]very functional sign, no matter what kind, activates a process of semiosis, conjoining the object of the sign (what it's about) with the interpretant (sign meaning) into the sign interpretative effect. The same way the table of periodic elements provided a rich mapping to represent the complex realities of chemical variations, so the classification of 66 signs provided a variety of mental representations of sign interactions and the variety of mental operations (semiosis).[5]

Coincidentally, the creation of a new array of sound production (surround sound) increased the complexity of the algorithms[6] utilized to distribute wave arrays and sound distribution. In addition, the recording process increased in complexity, as a multi-array microphone placement, the addition of multi-track and individual sources was necessary to recreate the sense of this aurally surrounded feeling. The placement of channels increased from two in stereo, to five and seven in surround sound. The first surround sound experiment was done in 1940, with the Disney film *Fantasia*,[7] where the goal was to duplicate the concert experience in the movie theatre. In the same way that Peirce divided the interpretant and the object to

5 Keynote Speech at the 44th Annual Conference of the Semiotic Society of America, Portland, Oregon, in October 2019.

6 An algorithm is a sequence of clear and well-defined computational instructions for implementation in computations or action. These processes avoid ambiguity and are created to generate multiple channels of audio data processing recreating the imitation of human aural perception and sound triangulations.

7 Disney, Walt. Walt Disney Productions, 1940.

increase complexity in the sign, the audio imaging is divided into either a 2+2+1 channel array in the case of 5.1 surround system, or a 3+3+1 in the 7.1 surround system. With unmatched fidelity, while adding a sense of realism and detail, the surround sound imitates closely the experience of a performance, as it duplicates the triangulation of the brain and the distances of different sound objects, creating an artificial mapping of the sound. In the same way, a wider array of representation, the 66 class signs provide an unmatched fidelity of sign classes and the relation of the sign classes. The musical recording and reproduction of sound was based on a musical performance, imitating the process of hearing music live.

The multi-channel complexities of surround sound added a layer of complication as music is now distributed in several avenues creating a whole auditory experience. One process that can account for this extra layer of difficulty is the elaboration of multi-modality as a semiotic enquiry process. Gunther Kress and Theo Van Leeuwen proposed that multimodal meaning creates meaning in every and any sign, at every level, and in every mode. They propose four strata for the typology of meaning construct: discourse, design, production, and distribution. The stratal configuration between modes, and the messages embedded in the communication merge to create a new conglomerate of meaning. This methodology works quite comfortably, particularly in the arts, film, music, and other artistic expressions where several mediums of communication are blended together for a compound expression. Modes take front seats, rather than sign interaction. However, the consideration of sign classes as modes, or groups of signs compiled under a mode of communication forces the typology of sign classification to yield meaning to the dominant mode. What follows is different strata are then combined to produce a new layer of signification, that in return becomes the new interpretant, creating a compounded interpretant (if we are to continue applying Peirce's logic).

We now consider the last example of music recording and reproduction, our latest technical achievement in sound: the 3D sound experience. Developed by Sennheiser and other researchers, the Ambeo experience provides a three dimensional experience of enveloping sound, where the sound is not coming from one source, but rather imitates the sphere of air surrounding the performance, placing the listener in the middle and changing the parameters of the sound as the listener changes perspectives or perceptional positions. There are no more channels, but instead, one sphere reproducing the environment of an all-immersing sound experience.[8] Ambeo's promise is the achievement of virtualization, by capturing the characteristics of the room, the speakers adapt to the environment to provide a true surround immersive experience. The recording channels are decoded with highly complex algorithms that process the sound to recreate the immersive nature of the performance. So far, the parallel audio recording-reproduction technology and the sign action representation (semiosis) works very well. However, there is one piece of music I would like to introduce to finalize my argument; the infamous 4'33" by John Cage.

John Cage, American composer (1912-1992), wrote this piece in three movements, for any instrument or group of instruments. He instructed the performer not to play their instrument for the entire time span of 4'33". The actual performance

8 Available at https://en-us.sennheiser.com/ambeo.

is the performative act of non-performance. The objective is for the listener to be made aware, to bring awareness of the sounds from the environment the listener occupies. During regular performances these surrounding sounds are blocked out of awareness in order to keep focus on the performance. Cage's 4'33" brings the actual performance out of the equation to emphasize the environmental nature of sound and the influence that force has on a performance, while the actual piece is not performed. The composition is based not on silence, but on the conglomerate of sound that is not in the awareness of a given performance, but still present, nonetheless. The idea is that any sound can constitute music, including internal sounds, heartbeats, sneezing, coughing, breathing, etc. The same performance of 4'33" can be performed in different scenarios (a dinner party, a train station, symphony hall). All three performances of the same piece, same composer, same aesthetic, will be radically different, almost completely opposed in quality and context. While the recording and performing techniques explained before would be the same in all three instances in Cage's piece, the result and aural representation of cognitive understanding would be quite disparate.

I am willing to state that, signs and class signs, particularly when entering the domain of emotional interpretants, are as unreliable in the analysis of their mapping as the performance of Cage's piece. A new layer of relations is definitely present in the semiosis and interaction of signs. In Cage's example, the silence is in juxtaposition of what is called music. By requiring the performer to be silent, the sounds that surround the performance are brought to the forefront becoming a primary part of the listener's awareness. The sound was always there, the listener was not aware of its existence. These sounds operate and live in a multidimensional sonic layer being a part of the whole experience. If the performance takes place in a rehearsal room, the sounds hold a certain characteristic that gives the performance a quality or trait. The mode of possible presentation changes the actual signs in the musical performance, which in this case is aurally suppressed to bring this hidden dimension to the forefront. Considering both cases, the 3D sound immersive technology and Cage's addition of outside elements of the performance for the completion of elements that are present, I propose the idea that there is a level of multidimensionality in the process of semiosis which we are either unaware due to technological deficiencies (logical awareness), or we are in the phase of a system that is so complex, that realizing the method for inquiry may be an arduous task, if not a fool's errand.

I postulate that modeling Cage's example, the sign classification and the analysis of the actions of signs parallel the conceptual understanding of musical recording and reproduction. In the interpretative effect of sign activation, emotional, energetic, and logical, we are unable to map the effects produced in the multidimensional interaction between the signs, as we are not aware of the mechanics of this interaction. If we were to take a simple example, drawing back to periodic table of elements, the chemical composition of water is a simple [H_2O]. As the water transforms toward solidification, the bond of molecules changes the composition. If we were to add whiskey to the glass with ice, the combination would create a rather different chemical combination than the original water. It may be similar to water, but it certainly changed. Signs follow the same process of adaptation and change as chemical elements. We may classify a sign within the parameters of

Peirce's sign classification, however, as they interact and touch or influence each other in the volatile world of the semiosphere, signs become adulterated by a whole set of emotional interpretative effects that do not follow necessarily the same logical parameters as the logical or energetic interpretative effect. In addition, they start to create a compound of sign signification that is not a multimodal schema, but a synthesis of different elements, that not only influence and change each other, but create new and unknown types of signs not yet classified. To add to the complication, as in the example of Cage, when we remove the sign type we are observing, we find, that other signs may be working silently in the background providing a layer of signification that creates a multidimensionality that transforms our expectations of sign behavior.

With the disregard for truth and the processes of logical inference we are experiencing, which seem illogical and chaotic, we can only assume that we are at the verge of a new awareness that requires us to dedicate our efforts to figure out this new logic of the future.

References

BORGES, Priscila. The classes of signs as a tool for semiotic inquiry. *In:* OWENS, Geoffrey R.; KATIC Elvira K. (ed.). Semiotics 2013: Why semiotics?. [*s. l.*] The Semiotic Society of America, 2013. p. 281-291.

DEELY, John. *Introducing semiotic*: its history and doctrine. Bloomington: Indiana University Press, 1982.

DEELY, John. *Basics of semiotics*. Bloomington: Indiana University Press, 1990.

DEELY, John. Semiosis and Human Understanding: revised version of the Conference in the *NBU Aula Semiotics*, 17 September 2014, and Masters Series of Lectures in *12th World Congress of the IASS/IAS*, Sofia, Bulgaria: New Bulgarian University, 16-20 September 2014.

HOUSER, Nathan. On Peirce's theory of propositions: a response to Hilpinen. *Transactions of the Charles S. Peirce Society*, v. 28, n. 3, p. 489-504, Summer 1992.

HOUSER, Nathan. Keynote Speech. *In*: 44th ANNUAL CONFERENCE OF THE SEMIOTIC SOCIETY OF AMERICA, October 9-13, 2019, [Oregon, USA].

JAPPY, Tony. *Peirce's twenty-eight classes of signs and the philosophy of representation*. New York: Bloomsbury Publishing, 2017.

KRESS, Gunther. *Multimodality*: a social semiotic approach to contemporary communication. London & New York: Routledge, 2010.

KRESS, Gunther; VAN LEEUWENN, Theo. *Multimodal discourse*: the modes and media of contemporary communication. London: Hodder Education, 2001.

LISZKA, James J. *A general introduction to the semiotic of Charles Sanders Peirce*.

Bloomington: Indiana University Press, 1996.

PEIRCE, Charles S. *Collected Papers of Charles Sanders* Peirce. Edited by HARTSHORNE, C. WEISS, P. & BURKS, A. W. Cambridge, MA: Harvard University Press, 1931-1958. 8 v. [Cited as CP followed by volume number and paragraph].

PEIRCE, Charles S. *The essential Peirce*: selected philosophical writings. Edited by HOUSER, N. et al. Bloomington: Indiana University Press, 1992/1998. 2 v. [Cited as EP followed by a number refers to volume and page].

POINSOT, John. *Tractatus de Signis*: the semiotic of John Poinsot. Interpretative arrangement by John Deely in consultation with Ralph Austin Powell, from the 193º Reiser edition (emended second impression) of the Ars Logica, itself comprising the first two parts of the five part Cursus Philosophicus, of 1631-1635, by the same author. Berkeley and Los Angeles: University of California Press, 1985.

SHORT, Thomas. *Peirce's theory of signs*. Cambridge, MA: Cambridge University Press, 2007.

WEISS, Paul; BURKS, Arthur. Peirce's sixty-six signs. *Journal of Philosophy*, v. 42, issue 14, p. 383-388, July 1945.