Thinking at the Edges

Nathan Houser

Indiana University in Indianapolis

Abstract: The field of semiotic studies requires borders to function as a discipline, but as a living science it is essential that those borders be unheeded. When Charles Peirce opened the modern field of semiotic studies he understood that he was an intellectual pioneer preparing the way for future semioticians. Peirce's decision to equate semiotics with logic would likely seem bizarre to most professional logicians today yet his decision followed naturally from his view that all mental operations are sign actions and that semiosis is inferential. Peirce's life-long study of sign types eventually led to a detailed, though provisional, classification of sixty-six distinct varieties of semiosis, many of which generate emotions or reactions rather than thoughts. Only twenty-one classes of signs yield interpretants that carry truth values or purport to be truth-preserving; the sign actions associated with these signs constitute the sphere of intellectual semiosis. The remaining forty-five non-intellectual sign classes drive perception and dominate the often unconscious mental operations that support and enrich day-to-day life. But this is also the realm of semiosis where memes flourish, where emoji function, and where propaganda first strikes a chord. This is the semiotic sphere where communal feeling can be engendered, but it is also the sphere of mob psychology. We are in troubled times during which signs are being used strategically to create dissension and social unrest and to generate disrespect for the very institutions that maintain the intelligence and practices that are fundamental for the survival of our way of life. It is time for semioticians to join forces against the weaponization of signs, and I believe an investigation of the more primitive non-intellectual sign classes that Peirce identified will help lay the groundwork for the coming battle.

Keywords: Peirce, sign classes, semiosis, inference, non-intellectual semiosis, percept, perception

’ll begin with a few words about the founder of our society, Thomas Sebeok, the man who I am honored to represent as the recipient of the fellowship award that bears his name.[1] Although Tom departed from

---

[1] This paper was originally written for presentation on 11 October 2019 as my Sebeok Fellow Address at the 44th annual SSA conference in Portland, Oregon. I have made some

the Peircean world of secondness almost eighteen years ago, he was a personal friend of some of you and is known to all of you, so there is no need for me to elaborate on his central role in the rise of semiotics in the 20th century. Suffice it to say, his role was pivotal. What is not so widely known is that, beginning in the 1970s, Tom began promoting various projects to bring Peirce's unpublished writings into print and he was instrumental in establishing the Peirce Edition Project at Indiana University.[2] When I moved to Indianapolis in 1983 to join the IUPUI philosophy department and to continue my work for the Peirce Project at its home base, Tom took on the role of informal advisor and invited me to join the faculty of his Bloomington Research Center for Language and Semiotic Studies. I have gratifying memories of meeting with Tom at his favorite Bloomington restaurant, The Uptown Café, to ask for help with grant proposals or for advice on dealing with university administrators. My own contribution to semiotics has principally been to further the study and understanding of Peirce's theory of signs through my teaching and writings and my years of labor for the Peirce Critical Edition, and I owe Tom a debt of gratitude for his support over the years.

The theme of the Portland conference is *the semiotics of borders and the borders of semiotics.* I want to acknowledge at the outset the shadow of nativism, racism, and alarmist politics that today looms over the very idea of borders and evinces a fearful and hateful scourge which is corrupting the minds of individuals and institutions the world over. Some of you have addressed this critical predicament and I commend you for that, for I believe that semioticians must be in the front lines of the looming battle over the fate of liberal values. I will make some brief remarks in conclusion to explain why I think this; but for now the borders I have in mind primarily concern conceptual spaces and are of less urgent existential consequence than the boundary lines between nation states. What I have in mind are the boundaries that separate one idea from another, or that separate theories, or areas of study, or disciplines, or conceptual paradigms. Semioticians are all too familiar with borders of this sort and know that they, too, are not without existential consequence.

In pursuing our field of study, we have pretty relentlessly been accused of transgressing the boundaries of other disciplines. This cannot be

revisions but have retained the presentation format. I am grateful for the lively discussion following my presentation in Portland and for recent deliberations with T. L. Short about Peirce's views on unconscious inference. The Semiotic Society of America was founded in 1975 at the first meeting of the North American Semiotics Colloquium held on 24–25 July at the University of South Florida.
  [2] For more on Sebeok's impact on Peirce scholarship see Houser 2001.

avoided, because even though the field of semiotic studies may require a defined border to function as a discipline, as a living science it is essential that disciplinary borders be unheeded. Just as the cognitive scientist must roam unimpeded through the fields of logic, psychology, philosophy of mind, computer science, and brain science, so too the semiotician must be free to explore these fields of research; but, more than that, the semiotician must be free to roam over the entire range of all knowledge for which signs and signification are fundamental. But that is the entirety of knowledge for, as Sebeok stressed, "semiotics [...] circumscribes what we can know" (1991: 12). Consequently, semioticians must cross borders, often lingering at the edges of boundaries that separate fields of study, hopefully seeing with eyes unveiled by the obscuring margins of the paradigms of those bounded disciplines. When Charles Peirce opened the modern field of semiotic studies, he understood that what lay before him was a new wide-ranging area of research so vast that the most he could do was survey the far-flung territory and prepare the way for future semioticians (c.1907: CP 5.488).

Peirce's intellectual development might fairly be said to have been punctuated by conceptual boundary concerns. He worked at the edges of the conceptual structures and paradigms of his time, sometimes seeing the need to lay down borders, as he did between psychology and logic, and sometimes abolishing them, as when he claimed that we are mistaken if we suppose that there is an absolute boundary separating the internal world from the external world (c.1893: CP 7.438). Peirce's commitment to synechism, the principle that the supposition of continuity should steer our thought, inclined him to fix boundaries provisionally, but, as he reminded John Dewey, we must have them to make necessary distinctions: to know right from wrong, for example, or truth from falsity (1904: CP 8.240). Peirce was especially interested in how we can glean information from our experience and use it to guide us safely and agreeably throughout our days and to expand our knowledge more generally. From his early boyhood he recognized the need to fine-tune our senses to improve our powers of observation, but he understood that inference was the process by which experience can be cognized and knowledge can be multiplied, so he diligently explored the conceptual territory of logic in order to understand the formal parameters of good reasoning.[3] He discovered that the territory of logic, which he came to regard as a normative science, was

---

[3] What counts as good reasoning, and the related formal protocols, depends on whether security (approach to certainty) or uberty (value in productiveness) is privileged (1913: CP 8.384, also in EP 2.463ff.).

inadequately demarcated, divided as it was between deductive and induc-
tive inferences, and he is credited with adding a third logical province:
abduction. By recognizing abduction as an inferential process, even if one
that privileges utility and fruitfulness over security,[4] he was able to extend
the scope of logic to encompass such hitherto supposedly nonrational
processes as instinctive responses and inspired guesses. Peirce realized
that abduction as a living inferential process is largely psychological or
neurophysical but he understood that it is up to the logician to work out
the normative canons for abduction as a form of inference. Peirce had
succeeded in charting out a greatly expanded territory for logical research
which, however, remained largely unexplored until Norwood Russell
Hanson's mid-20th century work on the logic of discovery (Hanson 1958).

Peirce's engagement with conceptual border issues is further illustrated
by his famous classification of sciences and his tireless effort to work out
their boundary conditions.[5] Consider his deliberation over how to locate
semiotics within the domain of the sciences and his decision to equate
it with the normative science of logic.[6] However curious this may seem
initially, we know that Peirce was, after all, one of the world's leading
logicians; and he did not make such claims lightly. Of course even John
Locke, when he christened the philosophical study of signs with the name
"semiotics", declared that this field of study, if duly cultivated, would af-
ford us a new logic (Locke 1690: 362); and the great pioneer of algebraic
logic, George Boole, began his pivotal investigation of the *Laws of Thought*
with a discourse on signs (Boole 1854).[7] But no semiotician with logical
acumen matching Peirce's has made this claim more forcefully than he
did. In what way, then, did Peirce conceive of semiotics that explains his
equating it with logic? A comprehensive answer to this question would
have to take into account many factors that I will pass over,[8] but what I

---

[4] Security in this sense does not refer to safety with respect to matters of vital im-
portance but to certitude and inferential fidelity such as deduction guarantees, induction
aims for as best it can, and abduction more or less sacrifices for the benefits of uberty.

[5] See Kent 1987 for a comprehensive treatment of Peirce's work on the classification
of sciences and the place of logic/semiotic in his classification(s).

[6] Max H. Fisch qualifies this by pointing out that Peirce identified logic with the whole
of *cenoscopic* semiotic (1908: CP 8.343); other names Peirce gave to cenoscopic semiotic
include formal, general, normative, and speculative semiotic. There are also "idioscopic
studies of signs" which do not belong to logic; these may be "as various as the idioscopic
sciences themselves—physical, chemical, biological, geological, anthropological, psycho-
logical, medical, musical, economic, political, and so on" (Fisch 1986: 339).

[7] On page 24 Boole claims that "in studying the laws of signs, we are in effect study-
ing the manifested laws of reasoning."

[8] See Fisch 1986: 338–344, Bellucci 2014, and Jappy 2017: 11–14, for helpful discus-
sions of this question.

believe is key is that since Peirce held that all thought is in signs (1868: EP 1.24; 1894: EP 2.10, 1906: EP 2.380, 1907: EP 2.402) and that all semiosis is inferential[9] then the investigation of forms of semiosis is, at the same time, an investigation of forms of inference, putatively the subject matter for logic. It follows that Peirce's detailed classification of signs into sixty-six distinct kinds, although it is often regarded as a classification of static sign-types, is arguably a classification of types of semiosis or, in other words, types of inference. Peirce's classification, then, may be regarded as an originative mapping of an expanded territory for normative logic.

I realize that few professional logicians, today, are likely to see things this way, largely because their focus is on the narrow subset of inferences that can be represented in the syntax of formal argumentation (and, for the most part, deductive argumentation). But Peirce thought about inferential processes and operations more broadly, allowing even for unconscious inference,[10] making it plain that he did not suppose that all forms of inference constitute what he sometimes called reasoning proper, reasoning conducted deliberately and, at least to some extent, under self-control (1895: EP 2.11–12).[11] Under his definition of "inference" for the *Century Dictionary*, Peirce defined "unconscious inference" as "the determination of a cognition by previous cognitions without consciousness or voluntary control" and for his definition of "cognition" he included "the formation of a concept" and for his definition of "concept" he included "the predicate of a (possible) judgment; [...] the immediate object of thought in simple apprehension" (Peirce 1899). So we see that Peirce left room for inferences, or quasi-inferences, that operate on non-propositional cognitive, or mental,

---

  [9] As far as I know, Peirce never asserted directly that all semiosis is inferential but that is not surprising because he very rarely used the word "semiosis". Yet, after his early (c.1865) identification of all variants of illation with the sign relation (see Murphey 1977; Bellucci 2016), Peirce consistently described mental operations (sign actions) as inferential (1893: CP 5.313), even holding that "inference is the essential function of the cognitive mind" (1893: CP 2.444 n.1), and it is widely acknowledged that he held that all semiosis is inferential (see, for example, Deledalle 2000: 18, 84; Eco 1997: 127; Nelson 1992: 36; and Murphey 1961: 115). It remains to sort out all of the varieties of inference and quasi-inference that constitute inference in the broad sense I believe equates with semiosis.

  [10] Peirce's use of "unconscious" cannot be distinguished from "subconscious" in the way these terms have diverged in meaning in post-Freudian psychiatry. The first part of Peirce's definition of "unconscious" in the *Century Dictionary* is as follows: "1. Not conscious. (a) Not occurring in or attended by consciousness; subconscious: as, *unconscious* inference." It is interesting that Peirce's early colleague from the famous Metaphysical Club, Oliver Wendell Holmes, had delivered the Phi Beta Kappa Society address at Harvard in 1870 and gave much attention to unconscious mental action, referencing Leibniz for support; he characterized the unconscious mind as "the underground workshop of thought" (Holmes 1872: 38).

  [11] See also Peirce's definition of "inference" in the *Century Dictionary*.

states. I must admit that this is an unsettled matter for Peirce scholarship, due perhaps to the fact that Peirce's theory of inference seems to have grown somewhat enigmatic over the years as his theory of signs became more intricate and as his understanding of such psychological processes as apprehension, suggestion, association, and perception became increasingly more refined. There is no doubt that Peirce often regarded inference *in actu* as the formation or derivation of a belief or proposition on the basis of another belief or proposition by virtue of a habit of thought, or leading principle (1877: W 3.245, CP 5.367). Inference in this narrow sense always begins with a proposition or perceptual judgment and involves a conscious, if indistinct, "reference to a genus of arguments" (1891: W 8.235, CP 8.63). But, as Murray Murphey pointed out in elucidating Peirce's intellectual development, Peirce eventually sought to escape the conceptualism and subjectivism of a theory of conception that had no contact with an empirical given (Murphey 1977: 601). According to Murphey, Peirce "found his solution in the theory of the percept and the perceptual judgment, and in the division between conscious and unconscious inference" (1977: 601).

A brief review of Peirce's solution will help show the need for the in-depth study of Peirce's full classification of signs with special attention given to the more primitive non-intellectual signs. As a start, it will be good to note that Peirce embraced the peripatetic maxim: "nothing is in the intellect that was not first in the senses" (1903: CP 5.181). Experience is rooted in sensory impingements (proximal stimuli) that are unconsciously synthesized into percepts. Percepts are the product of conscious sensory experience but the relevant consciousness only involves feeling (primisense) and a sense of resistance (altersense), not thought or the sense of mediation (n.d.: CP 7.276, n.d.: CP 7. 543). The percept is the empirical given—"an image or moving picture or other exhibition" (1903: CP 5.115)—and is neither conceptual nor propositional and thus is distinct from the "cognitive given" of the logical empiricists (Bernstein 1964: 167). Sometimes Peirce dismisses the formation of the percept as an uncriticizable psychological operation of little importance for logic (1903: CP 5.55) yet he also tells us that "we have to set out on our intellectual travels from the home where we already find ourselves" and that home, he insists, "is the parish of percepts" (1901: EP 2.62). The starting point for reasoning is our percepts not our sensations. Percepts stand at the entryway to semiosis and present us with compelling qualitative experience which, according to Carl Hausman, sets the interpretative process in motion and prompts interpreters to form perceptual judgments (Hausman 2006: 237). Although not themselves signs, percepts intrude on consciousness and they stand

mute as insistent objects before the semiotic mind. Presumably, percepts are formed from proximal stimuli by an unconscious process involving the coalescence of qualities somehow due to the operation of apprehension, suggestion, and association under the influence of cognitive habits. The formation of percepts may itself involve non-intellectual semiosis at a pattern recognition or qualitative level and thus be quasi-inferential (1891: CP 8.66)—this seems almost axiomatic for biosemiosis. According to Dines Johansen "the force exerted by the object is the result of an inferential (and unconscious) synthesis" (Johansen 1993: 76). The noted psychologist, Irvin Rock, submits that the perceptual processing triggered by proximal stimuli, though in effect an "effort after meaning", is not a consciously goal-oriented process but that "the motivation for it must be the result of evolutionary adaptation" (Rock 1983: 16).

Conception, and therefore intellectual life, begins with perceptual judgment, "the first judgment of a person as to what is before his senses" (1903: CP 5.115).[12] Clearly, the connection between the percept and the perceptual judgment is not arbitrary yet, since the percept is not propositional and thus cannot serve as a premiss, the perceptual judgment cannot be a conclusion of reasoning where reasoning is regarded as a conscious inference that adheres to a genus of arguments. According to Beverly Kent, the perceptual judgment is an "interpretation arrived at through the unconscious synthesis of an endless series of percepts" (Kent 1987: 45–46). Christopher Hookway suggests that there are echoes of Kant's schematism, which "makes essential references to *sequences* of intuitions in time", and to the metaphor of the "composite photograph" which "helped Peirce to think about this dark and difficult [question]" (Hookway 2002: 41–42). Karl-Otto Apel says that Peirce "understands the perceptual judgment as an unconscious limiting case of abductive inference and the perceived quality or percept as an iconic sign which can enter into experience only by being integrated into the semiotic inference process" (Apel 1995: 113). Richard Bernstein expands on this by emphasizing Peirce's insistence that although we "feel the blow" of the percept" and see its contents "arranged into an object", we know nothing about it except "by the testimony of the perceptual judgment" (1903: CP 7.643). It is in the judgment that the percept is integrated into the semiotic inference process but, as Bernstein points out, it is "the percept as interpreted" that is in the perceptual judgment (Bernstein 1964: 176). Peirce calls the percept as it is represented

---

[12] For a more detailed elaboration of Peirce's account of perception see Bernstein 1964, Rosenthal 2004, Hausman 2006, and the papers by Aaron Wilson, Evelyn Vargas, Richard Atkins, and Catherine Legg in Hull and Atkins 2019.

in the judgment the percipuum to distinguish it from the percept which, although we experience it directly, we can only know about by abstraction.[13] According to Hausman, the percipuum makes its entrance into semiosis as an immediate object of an indexical sign which represents the obstinate percept (the dynamic object) as having the perceived character (Hausman 2006).[14] Evelyn Vargas points out that by referencing a perceived character (viz. appealing to a general predicate) to explain what the perceived object is, the perceptual judgment constitutes a hypothesis, which comports with Peirce's assessment that perception is an extreme case of abductive inference (Vargas 2017: 23 n.13). So Peirce's theory of perception begins to merge with his semiotics and we might speculate that the pivotal transition between sensation and understanding, including the more basic unconscious inferential operations, draws heavily on Peirce's catalog of sign types.

Strictly speaking, to say that inference can be unconscious, though not irrelevant for psychology or philosophy of mind, is irrelevant for logic. Peirce stressed that his interest was in the logic, not the psychology, of mental operations (1906: CP 4.539).[15] Insofar as Peirce's extended classification of signs can be properly understood as a comprehensive classification of inference types, what is important for logic is not whether consciousness is necessary for the actual occurrence of inference (or for semiosis) but what are the essential relational structures and the information transfer efficacies of the inference (or sign) types. It is important to bear in mind that when Peirce identifies semiotics with logic he is treating logic as a normative science, the science of ideal forms of inference—forms that reveal how inferences of different types ought to be carried out in order to provide appropriate levels of assurance in their outcomes. I believe it was Peirce's identification of semiosis with inference that led him to equate semiotics with logic and that gave him confidence, at least hope, that logicians would take up the study of non-intellectual semiosis: "it is not likely that in our time there will be anybody to study the general physiology of the non-logical signs except the logician."[16]

---

[13] The form of abstraction by which we can mentally separate the percept from the percipuum Peirce called precission. See Houser 2010 for discussion of Peirce's three kinds of mental separation.

[14] See Vargas 2017: 21, for elaboration of Peirce's contention (1903: CP 7.628) that the perceptual judgment must be an indexical sign.

[15] See Peirce 1898: CP 6.225–230 for discussion of what might appear to be a tension between psychology and logic in his theory of the unity of consciousness.

[16] Quoted from 1906: R 499 in Fisch 1986: 340. Surely it would have pleased Peirce, and perhaps surprised him, to know that in the 21st century it is no longer necessary to

I think Peirce envisioned a future where logicians will have crossed old boundaries that are as yet holding them back. Whether Peirce's semiotic analysis will become the morphology of inference for the logic of the future, though not quite a crapshoot, is obviously far from certain. Pioneers who work at the edges of reigning paradigms, especially when they transgress those paradigms and open the way to new ones, are only acknowledged as pioneers if in fact the paths they open are taken. Otherwise they are likely to be dismissed as oddballs or intellectual iconoclasts. But other logical innovations of Peirce's that were once thought to be oddball ideas, like his Existential Graphs,[17] are now widely regarded as foundational for the logic of the future,[18] and we may hope that his classification of signs will be as well.

Regardless of how Peirce's classification will fare in the long run of intellectual history, it provides semioticians with a powerful schema for identifying signs types and for making semiotic distinctions—and it will be the frame of reference for the remainder of my talk tonight. But I will try to avoid burdening you with unnecessary details about how Peirce derived his sixty-six classes from his ten trichotomies of sign characteristics based on his late analysis of signs as involving two objects (one immediate and the other dynamic) and three interpretants (immediate, dynamic, and final) and their links with his famous categories: firstness, secondness, and thirdness. I believe that what more I have to say can be said without disturbing your digestion with an excess of technical detail.[19] The key point is that every functioning sign, no matter what kind, activates a process of semiosis, a sign-action, which conjoins the object of the sign (what it's about) with an interpretant (often said to be the sign's meaning, but we can say, more generally, the sign's interpretative effect). The proper interpretative effect of some kinds of signs is a feeling (in Peirce's rather extended sense of that term); the proper interpretative effect of some other signs is an effort or appropriate action; and the proper effect of yet a third type of sign is intellectual, an interpretative thought and, ultimately, a deliberately formed intellectual habit (1907: EP 2.418, 430–431). These

---

depend on professional logicians to perform these labors: it can be left to semioticians with a logical bent.

[17] See Zalamea 2003 for an account of why Peirce's Existential Graphs were passed over by mainstream 20th-century logic.

[18] See Pietarinen 2020 for an extensive treatment of Peirce's graphical logic as the logic of the future.

[19] This address was given following the annual SSA banquet in Portland. Readers desiring technical detail concerning Peirce's sixty-six-fold classification can consult Jappy 2017, Borges 2010, Romanini 2006, Farias and Queiroz 2003 and 2006, Müller 1994, Sanders 1970, and Burks and Weiss 1945.

three kinds of interpretants, or interpretative effects, are usually classi-
fied as emotional, energetic, and logical. Bearing in mind that for Peirce,
semiosis is the mark of the mental, his mapping out all these divisions
and classes of signs is tantamount to a mapping of the space of possible
mental activity—his sixty-six classes of signs constituting sixty-six kinds
of mental operations or varieties of inference. It is telling that more than
half of the semiotic functions, thirty-six in all, issue in feelings.

In brief, what Peirce's sixty-six-fold classification reveals is that in
addition to the thirty-six sign-types that yield feelings, or emotional
interpretants, twenty-four others yield energetic interpretants, and the
remaining six varieties yield logical interpretants. If we identify the
range of intellectual semiosis as encompassing all sign-actions involving
pragmatically meaningful conceptions,[20] there are twenty-eight intellec-
tual sign-types, fifteen of which are conceptual signs (symbolic signs of
the nature of logical terms), ten of which are signs of fact (propositional
signs), and three signs of reason (the three argument-types). But that
leaves thirty-eight emotional and energetic sign-types that do not yield
interpretants which contribute to reasoning in any straightforward way.[21]
These sign-types constitute the vital sphere of non-intellectual semiosis
(which we have seen is crucial for perception).

For full disclosure I must point out that Peirce never claimed, nor
even believed, that his sixty-six classes of signs fleshed out the only useful
sign classification, nor even the one he would necessarily settle on given
enough time to work through all the complexities he knew would have to
be resolved. But just as Mendeleev's periodic table of elements profoundly
advanced chemical research by providing a framework rich enough to ef-

---

[20] Peirce explained that pragmatically meaningful conceptions are the ones he refers
to as "intellectual concepts": "those upon the structure of which, arguments concerning
objective fact may hinge" (c.1907: CP 5.467).

[21] I have limited my count of propositions to symbolic signs. Frederik Stjernfelt, in his
reconstruction of Peirce's theory of propositions (Stjernfelt 2015), argues that the classes
of non-symbolic dicent signs (dicent indexical signs) are propositional. That would add
an additional eight intellectual sign-types. Stjernfelt's argument seems to require regarding
dicent indexes as complex signs which combine iconic and indexical elements essentially
as dicent symbols do, but it seems to me that dicent indexes represent existential facts qua
facts rather than as the truth-bearing subjunctive conditionals that dicent symbolic signs
seem to be. But my conclusions are provisional as much remains unsettled in scholarship
related to these matters. It could be argued that the only strictly intellectual signs are those
which ultimately (or at least ideally) conclude in intellectual habits and there are only six
of the sixty-six classes for which this is the case. Furthermore, as anyone who works with
Peirce's extended classification quickly comes to realize, the order of the ten trichotomies
makes all the difference as to how the class counts turn out, and there continues to be
disagreements about that order.

fectively represent the complex reality of chemical variation, even without being the last word on that subject, so Peirce's classification of signs offers a research tool rich enough to represent the variety of mental operations, what we know to be semiosis, with more explicitness and detail than less complex classification schemas.[22] Twenty-seven years ago I opined that a full accounting for Peirce's sixty-six classes and his rationale for setting these parameters was arguably the most pressing problem for Peircean semioticians (Houser 1992: 502). A lot has been done in the passing years to address this problem, though much remains to be worked out. But I am inclined to think that now it is the classes of non-intellectual signs, those signs for which truth values are not relevant, which are most in need of painstaking investigation.

Why do I believe this? I might answer indirectly by saying it is because of the lessons of Brexit and the MAGA ordeal, together with the mounting evidence that the values of liberal democracy have lost widespread appeal. I will say a bit more about that presently. I think it is evident that these are troubled times. It seems as though semiosis on the whole has somehow gone haywire and that we have to bring it under control—but first we must try to better understand what has gone wrong. Is the problem that emotional and energetic semiosis have become too dominant? Are we depending too much on memes and emoji for communication rather than on more traditional vehicles of influence and discourse? Or is it that we have lost respect for the truth—that our discourse has been divorced from any robust commitment to factual reality? Remember Rudy Giuliani's declaration to Chuck Todd that "truth isn't truth any more" and Kellyanne Conway's brazen appeal to "alternative facts". And that was just the tip of the iceberg.[23] "Fake news" has become the official label for any report, no matter how well-documented, that challenges the White House party line. For those of us who live academic lives, the now prevalent disregard of truthfulness does incline us to suppose that loss of respect for the truth is at the core of our current predicament. This view has led many pundits to lament that we have entered a post-truth era where we have traded truth for *truthiness*, a word coined by Stephen Colbert, and defined as "the belief or assertion that a particular statement is true" based on intuition or

---

[22] According to Vincent Colapietro, Peirce's classifications and abstract definitions of signs allow us "to see as instances of semiosis processes we otherwise would not regard as such" (Colapietro 2007: 23).

[23] Recently President Trump revealed what we might say is an extreme nominalist epistemology by lamenting that we are increasing the number of cases of COVID-19 by doing so much testing: "When you test, you have a case. . . . If we didn't do any testing, we would have very few cases" (Harvey 2020).

perception "without regard to evidence, logic, intellectual examination, or facts." Sure, you may have *your* truth, but *my* truth is unassailable. I am certainly troubled by this debasing of truth but I wonder if that is really why semiosis seems to have gone awry. I am inclined to think that we have overestimated the importance of truth as an ideal by tending to regard it as a universal aim and by supposing that reigniting respect for truth will rehabilitate our ailing body-politic.

Historically, truth stands on a high pedestal but what it really means has always been rather vague. Even for philosophers its meaning has been much disputed. Typically, though, there is at least an expectation that however truth is expressed there must be adherence to facts. Poets, appealing to poetic license, tend to be less concerned about adherence to facts and even sometimes identify truth with beauty, as Keats did, or with God, as Emily Dickinson did.[24] I'm inclined to think that the common conception of truth conforms more to the poet's view than the philosopher's, but with less aesthetic flair. I think the common conception of truth is something like "what I believe" or maybe "the really important things I believe", and the really important things I believe might be said to be capital "T" truths or absolute truths. I think we can say that truth has generally been venerated, along with reason, as a paramount aim for enlightened civilization. I, too, venerate truth, and find it troubling that it has been debased, but I do not believe it should be our exclusive focus of concern.

If we step back into our academic guise to consider what truth is, I think we must accept that it is a value we assign to signs of a certain kind, namely, to propositions that represent what they purport to represent in the right way. Propositional signs represent the world, or some part of it, their objects, to be as characterized in their predicates. So a truth is a proposition that represents its object, however complex and whether real or fictional, *in the right way*, namely, as it really is. What that means for Peirce is that the object is represented in the way inquiry would settle on if carried on long enough.[25] We have seen that according to Peirce's classification there are ten propositional sign-types and three signs of reason (the three argument-types). These thirteen sign-types, together with the fifteen conceptual sign types that serve as predicate functors for

---

[24] From John Keat's *Ode on a Grecian Urn*: "Beauty is truth, truth beauty,—that is all Ye know on earth, and all ye need to know." And from Emily Dickinson's *Truth—is As Old As God*: "Truth—is as old as God— / His Twin identity / And will endure as long as He / A Co-Eternity".

[25] We must bear in mind that propositions are signs and that significance always depends on the interrelations of signs with their objects and interpreters. There can be no truth that is not of something for someone.

propositions, constitute the intellectual sphere of semiosis and are the only ones that can be evaluated as true or false, or as truth-preserving. Even though they account for less than half of the complete arsenal of signs at our disposal, they have been the almost exclusive concern of logicians and most philosophers.[26]

Given that so many of sign-types fall outside the intellectual sphere, one might surmise that non-intellectual semiosis must be a dominate sphere of sign-activity. Of course all of the intellectual signs are complex signs involving icons and indexes in their representational functions, from which it follows that some non-intellectual components are always operative at the intellectual level. In fact, it can be argued that the sphere of non-intellectual semiosis is the caldron of semiosy out of which the truth-bearing signs arise. This may lead one to suppose that truth really must be the natural end or goal of semiosis and that may help explain why the intellectual signs have been privileged. But we must remember that all the forms of non-intellectual semiosis can operate without entering the intellectual sphere and they can generate their own legitimate emotional or energetic interpretants. In fact, I am inclined to believe that it is non-intellectual signs that dominate the mental operations that support and enrich day-to-day life. But this is also the realm of semiosis where memes flourish, where emoji function, and where propaganda first strikes a chord. This is the semiotic sphere where communal feeling can be engendered, but it is also the sphere of herd mentality. That is why I think that non-intellectual semiosis is now most in need of painstaking investigation. Over the last decade, a lot of attention has aptly been given to the examination of signs and vehicles of communication which evoke emotional reactions but I believe that an intensive study of Peirce's classification of non-intellectual signs, and the psychological triggers that activate this considerable sphere of semiosis, will cast valuable light on our present predicament and perhaps give some critical guidance for a path forward. I have not undertaken the intensive study I am recommending and, in any case, it is a task for a team of researchers who are not daunted by Peirce's predilection for fine-grained distinctions, but I will make a few additional remarks to support my contention that Peirce's full classification of signs, including the non-intellectual signs, is a mapping of inference types that constitute an expanded territory for normative logic.

---

[26] Semioticians have been far less narrowly focused on factual and propositional signs than logicians and philosophers but, to be fair, there has been a lot of mainstream philosophical research on reference and denotation and other areas where truth-preservation is not an issue.

First, I'll reiterate that, according to Peirce, all semiosis is inferential, including the thirty-eight types of non-intellectual sign-actions. Granting that, for Peirce, the unconscious association of ideas, or even of feelings, is inferential, we can assume that some of the non-intellectual forms of semiosis are unconscious. But if at least some forms of emotional and energetic semiosis are unconscious, and if non-intellectual semiosis is exempt from criticism for truthfulness, as I maintain, how can this semiotic territory, which encompasses over half of our semiotic operations, belong to normative logic? To answer this, it is important to emphasize that the mental operations which constitute semiosis, or "psychical actions", as Peirce sometimes says (1893: CP 7.388, 7.444), are not brain states or physical processes. It is true that semiosis requires embodiment, typically a brain, but what makes a sign-action a mental operation is its teleological nature—that it is a process governed by purpose or final causation. Typically such purposes or ends are infixed in established habits, as Colapietro has noted (2000: 145). The teleological character of sign-action consists in there being purposes or ends toward which semiosis aims. That is why semiosis is normative. As I've indicated, the proper interpretative effects of signs fall into three classes: emotional interpretants, energetic interpretants, and logical interpretants. Truth is the normative aim *only* of logical or intellectual semiosis. What can be the normative aim of non-intellectual semiosis? What standards apply?

I think the answer is to be found in the account of normative science which Peirce developed in his later years (partly, I think, under the influence of William James). Peirce determined that philosophy has three main branches: phenomenology, normative science, and metaphysics. Normative science also has three branches: esthetics, ethics, and logic. These are theoretical, not practical, sciences and concern the laws of the conformity of things, or phenomena, to ends in different realms of human experience (CP 1903: 5.129, EP 2.200). *Esthetics* concerns the realm of feelings, *ethics*, the realm of actions, and *logic*, the realm of thought or representation. The ends that are supposed to guide us in these three realms are usually said to be beauty, right, and truth (1903: CP 5.121, EP 2.197), and goodness or badness is measured relative to these ends. In Peirce's most developed thought, he substituted *the admirable* for beauty as the end for esthetics. Since these are the normative values that Peirce associated with his basic ontological categories of feeling, action, and thought, and since we have already concluded that the aim of logical or intellectual semiosis is truthfulness, we can assume that the normative aim of emotional semiosis is beauty or admirability, and the aim of non-

symbolic energetic semiosis is rightness or moral goodness.[27] Whether it is possible to construct a formal logic that incorporates these normative values, along with truth and falsity, for the formal study of semiosis in all of its possible variant sign-types, at this point I simply don't know. Nor do I know yet how to reconcile this account of Peirce's sixty-six sign-types with the three most familiar branches of semiotics: speculative grammar, logic (critic), and speculative rhetoric.[28] My hope is that by recognizing that there is a vast arena of semiosis for which truth is not the point, and that non-intellectual semiosis can be studied as a form of inference and not only as psychological behavior, we can form a more comprehensive understanding of the universe of signs and, in so doing, contribute to finding a path out of the civic predicament we are confronting.

As I prepared this address, I strove to avoid too much formal analysis of sign classes, on the one hand, and too much polemical attention to the brazen war being waged on liberal democracy, on the other, but I fear I may have failed on both counts. I am especially not partial to jeremiads—but as I've said already, these are troubled times and one must not be fainthearted. I am convinced that regardless of the underlying motivation of the main instigators of the ongoing battle against Enlightenment values, whether it is racism, nativism, dogmatism, greed, aristocratism, or something else, the main weapons being employed come from a *semiotic arsenal*. The so-phisticated and extensive use of propaganda has been around for at least a century,[29] but with cable television's twenty-four hour entertainment opinion news and the now almost universal accessibility to the internet and social media, and the massively widespread adoption of memes, emoji, tweets, instagrams, and hashtags as dominant forms of communication, the power of propaganda to influence social consciousness and to impact civic action has increased almost exponentially. This is clearly a matter of

---

[27] I am not confident that these are the appropriate normative values for all the forms of non-intellectual semiosis. Much remains to be sorted out. We must not overlook that in his landmark papers on pragmatism Peirce maintained that the cessation of the irritation of doubt is the end of inquiry (semiosis) so that we might suppose that the aim of non-intellectual semiosis is relaxation or tranquility, a feeling of security and confidence to carry on in one's existential circumstance. See Houser 2016a for development of this idea.

[28] Tony Jappy notes that Peirce claimed to have extended logic "to embrace all the necessary principles of semeiotic" and recognized "a logic of icons, and a logic of indices, as well as a logic of symbols" but that, based on an unpublished paper of 1906 (R 298), Peirce restricted his "trivium"—speculative grammar, logic (critic), and speculative rhetoric—"to the study of the symbol" (1906: CP 4.9, Jappy 2017: 13).

[29] The extensive and shrewdly calculating use of propaganda seems to have burgeoned along with the sophisticated onslaught of advertising (or public relations). See, for example, the Wikipedia article on Edward Bernays; also see Bernays 1928.

grave concern for anyone who continues to venerate liberal democracy. Of course a great deal of powerful propaganda in traditional doctrinaire prose continues to issue from conservative think-tanks around the world (at last count, the Koch-funded Atlas Network has over four hundred partner organizations operating in over 90 countries),[30] but there has been a critical shift to platforms that favor simple non-intellectual signs that appeal to emotions and direct action. The sheer volume and ceaselessness of social messaging today, and the inkling that we have crossed into a new age, contributes to dissociation from core institutional anchors. But underneath these currents one cannot fail to see that there are powerful anti-liberal forces at work, forces that deliberately seek to undermine the amity and sense of unity that are necessary for a democratic society to thrive—even to survive. These forces have used emotional and energetic signs to turn social media into a battlefield. In testimony to Congress in September 2019, the Acting Director of National Intelligence reported that the greatest threat to international stability is no longer from kinetic warfare but from cyber warfare.

Why is the threat to our institutions so critical? Peirce questioned whether there is a clear boundary between individual minds and extended or social minds. His identification of thought with semiosis, and his recognition that signs are external transactions, led him to his logical conception of mind according to which minds are sign systems and thought is sign-action or semiosis. Dialogue is Peirce's paradigm for semiosis (Colapietro 1989: 22), which implies that mind is fundamentally structured to function in a social context. In order for an utterer and an interpreter to communicate, Peirce thought that parts of their minds had to fuse into a single mind, which he called "the commens" (1906: EP 2: 478).[31] So he believed that what we might think of as shared mind can operate across separate individuals, and even in extended group processes. According to this way of thinking, our social communities and cultural associations can be minded institutions, reservoirs of *social habits*—our culture's stores of social beliefs.[32]

Of special importance is the symbiosis that develops between individuals and social institutions. Although individuals depend in part on instinctive programming and on direct learning from experience to guide

---

[30] Nancy MacLean gives a well-researched and revealing account of the methods and influence of the Koch propaganda operation in MacLean 2017 (see esp., pp. 242–243, n.19, re: the extent of Koch-funded operations).

[31] From a draft letter to Victoria Lady Welby where Peirce also used the word "commind" apparently synonymously with "commens" (also in Peirce and Welby 1906: SS197).

[32] See Houser 2016b for further discussion of this point.

them safely through life, they especially depend on the social minds of the organizations and institutions they belong to for behavioral programming that pertains to social practices and cultural identity. The more successful institutions, those that survive and prosper over the ages, accumulate vast systems of useful information. These systems of useful information, the beneficial habits distilled from the trials and errors, and *successes*, of generations of human experience, constitute the social minds of the institutions that define cultures and perpetuate civilizations. Through these social minds, individuals can draw on consequential beliefs, and systems of beliefs, they could never develop (or program) on their own, thus greatly increasing their access to advantageous intelligence.

For many generations, two key distinguishing characteristics of the west have been its dedication to the ideals of the Enlightenment and its commitment to liberal democracy. The growing crisis in the United States is marked by a loss of faith in enlightenment ideals and by their rejection by vocal groups within the western orbit. The "minds" of the institutions that have actualized and maintained liberal democracy have to be animated by the citizenry they serve. If we lose respect for those institutions, if we stop identifying with them, we will cease to animate them and we will lose our identity as a nation and culture. When this happens it is not hyperbolic to say that we have lost our communal mind—and that we have put our civilization at risk. And that *is* happening.[33]

Is there some way to reverse course—to set us on a path out of the societal crisis civilization is now suffering? We semioticians are also citizens, and that is enough to draw us into service, but *as semioticians* we might justly take special umbrage that the destructive forces at work are weaponized signs and that the targets, western democratic institutions, are the hard-won edifices that preserve the intellectual and cultural fruits of generations of semiotic labor. Signs are being used strategically to create dissension and social unrest and to generate disrespect for the very institutions that maintain the intelligence and practices that are fundamental for the survival of our way of life. Vincent Colapietro, who at the 2018 Annual Meeting of the Semiotic Society of America was admitted into the select circle of Sebeok Fellows, has pointed out that individual persons are not only congeries of signs and feelings, as Peirce stipulated, but are also living actors who have the existential power to emerge from the mainstream to make a difference.[34] We can act, and we must—but

---

[33] I have developed this idea further in Houser 2019.

[34] See Colapietro 1989, Chapter 4, for a masterful treatment of Peirce's theory of the self and human agency; and see Colapietro 2006 for further development. See Houser

with definite purpose. At this moment in history we must help reveal the slippery semiosis that has so quickly led us to such a low point in civilized life but we must also help revive the importance of and respect for the truth. Truth may not be the unique universal value, as has sometimes been averred, but it remains a crucial goal to strive for when semiosis has been weaponized to spread social unrest and when deception and fabrication are rampant. The least we can do is be a voice for truth in these unsettled times. In the words of George Orwell: "In a time of deceit, telling the truth is a revolutionary act."[35]

References

APEL, Karl-Otto.
   1995.   *From Pragmatism to Pragmaticism*, trans. J. M. Krois (New Jersey: Humanities Press).

BERNAYS, Edward.
   1928.   *Propaganda* (New York: Horace Liveright).

BELLUCCI, Francesco.
   2014.   "Logic, Considered as Semeiotic", *Transactions of Charles S. Peirce Society* 50.4, 523–547.
   2016.   "Inferences from Signs: Peirce and the Recovery of the *σημεῖον*", *Transactions of the Charles S. Peirce Society* 52.2, 259–284. https://doi.org/10.2979/trancharpeirsoc.52.2.08

BERNSTEIN, Richard J.
   1964.   "Peirce's Theory of Perception", in *Studies in the Philosophy of Charles Sanders Peirce; Second Series*, ed. Edward C. Moore and Richard S. Robin (Amherst: University of Massachusetts Press), 165–189.

BOOLE, George.
   1854.   *The Laws of Thought* (New York: Dover).

BORGES, Priscila.
   2010.   "A Visual Model of Peirce's 66 Classes of Signs Unravels His Late Proposal of Enlarging Semiotic Theory", in *Model-Based Reasoning in Science and Technology*, ed. Lorenzo Magnani, Walter Carnielli, and Claudio Pizzi (Berlin: Springer), 221–237.

BURKS, Arthur, and Paul WEISS.
   1945.   "Peirce's Sixty-Six Signs", *Journal of Philosophy* 42, 383–388. https://doi.org/10.2307/2019195

2013 for more discussion of the importance of individuals for civilization.
   [35] This quotation is frequently attributed to Orwell but may be a misattribution. It is timely in any case.

COLAPIETRO, Vincent.
    1989.   *Peirce's Approach to the Self* (Albany: SUNY Press).
    2000.   "Further Consequences of a Singular Capacity", in *Peirce, Semiotics, and Psychoanalysis*, ed. John Muller and Joseph Brent (Baltimore: The Johns Hopkins University Press), 136–158.
    2006.   "Toward a Pragmatic Conception of Practical Identity", *Transactions of Charles S. Peirce Society* 42.2, 173–205. https://doi.org/10.1353/csp.2006.0019
    2007.   "C. S. Peirce's Rhetorical Turn", *Transaction of the Charles S. Peirce Society* 43.1, 16–52. https://doi.org/10.2979/TRA.2007.43.1.16

DELEDALLE, Gérard.
    2000.   *Charles S. Peirce's Philosophy of Signs: Essays in Comparative Semiotics* (Bloomington: Indiana University Press).

ECO, Umberto.
    1997.   *Kant and the Platypus* (New York: Harcourt Brace & Company).

FARIAS, Patricia, and João QUEIROZ.
    2003.   "On Diagrams for Peirce's 10, 28, and 66 Classes of Signs", *Semiotica* 147.1–4, 165–184.
    2006.   "Images, Diagrams, and Metaphors: Hypoicons in the Context of Peirce's Sixty-six-fold Classification of Signs", *Semiotica* 162.1–4, 287–307.

FISCH, Max.
    1986.   "Peirce's General Theory of Signs", in *Peirce, Semeiotic, and Pragmatism: Essays by Max H. Fisch*, ed. Kenneth Ketner and Christian Kloesel (Bloomington: Indiana University Press), 321–355.

HANSON, Norwood Russell.
    1958.   *Patterns of Discovery* (Cambridge: University Press.)

HARVEY, Josephine.
    2020.   "Trump Annihilated Online Over Claim 'We'd Have Very Few Cases' Without Testing", *Huffpost*, May 14.

HAUSMAN, Carl.
    1993.   *Charles S. Peirce's Evolutionary Philosophy* (New York: Cambridge University Press).
    2006.   "Peirce's Semeiotic Applied to Perception—The Role of Dynamic Objects and Percepts in Perceptual Interpretation", *Cognitio: Revista de Filosofia* 7.2, 231–246.

HOLMES, Oliver Wendell.
    1872.   *Mechanism in Thought and Morals* (Boston: James R. Osgood & Co.).

HOOKWAY, Christopher.
2002.   "'. . . a sort of composite photograph': Pragmatism, Ideas, and Schematism", *Transactions of Charles S. Peirce Society* 38.1–2, 29–45.

HOUSER, Nathan.
1992.   "On Peirce's Theory of Propositions: A Response to Hilpinen", *Transactions of the Charles S. Peirce Society* 28, 489–504.
2001.   "Sebeok's Contribution to Peirce Scholarship", in *The Invention of Global Semiotics*, ed. Marcel Danesi (Toronto: Legas), 83–90.
2010.   "Peirce, Phenomenology, and Semiotics", in *The Routledge Companion to Semiotics*, ed. Paul Cobley (London & New York: Routledge), 89–100.
2013.   "Peirce's Neglected Views on the Importance of the Individual for the Advancement of Civilization", *Cognitio: Revista de Filosofia* 14.2, 163–177.
2016a.   "The Imperative for Non-Rational Belief", *Cognitio: Revista de Filosofia* 16.2, 273–289.
2016b.   "Social Minds and the Fixation of Belief", in *Consensus on Peirce's Concept of Habit: Before and Beyond Consciousness*, ed. Donna E. West and Myrdene Anderson (Cham: Springer International), 379–400.
2019.   "The Disintegration of Social Mind", *Cognitio: Revista de Filosofia* 20.1, 62–76. https://doi.org/10.23925/2316-5278.2019v20i1p62-76

HULL, Kathleen A., and Richard Kenneth ATKINS, Editors.
2019.   *Peirce on Perception and Reasoning* (London: Routledge).

JAPPY, Tony.
2017.   *Peirce's Twenty-Eight Classes of Signs and the Philosophy of Representation* (London: Bloomsbury Academic).

JOHANSEN, Jørgen Dines.
1993.   *Dialogic Semiosis* (Bloomington: Indiana University Press).

KENT, Beverley.
1987.   *Charles S. Peirce: Logic and the Classification of the Sciences* (Montreal: McGill-Queen's University Press).

LOCKE, John.
1690.   *An Essay Concerning Humane Understanding* (London: Printed by Eliz. Holt, for Thomas Basset).

MACLEAN, Nancy.
2017.   *Democracy in Chains* (New York: Penquin Books).

MÜLLER, Ralf.
1994.   "On the Principles of Construction and the Order of Peirce's Trichotomies of Signs", *Transactions of Charles S. Peirce Society* 30.1, 135–153.

MURPHEY, Murray G.

    1961.   *The Development of Peirce's Philosophy* (Cambridge: Harvard University Press). References are to the 1993 republication (Indianapolis: Hackett).

    1977.   "Charles Sanders Peirce", in *A History of Philosophy in America*, Vol. 2, ed. Elizabeth Flower and Murray G. Murphey (New York: Capricorn Books), Chapter 10.

NELSON, R. J.

    1992.   *Naming and Reference* (London & New York: Routledge).

PEIRCE, Charles S.

    i1839–1914. The Charles S. Peirce Papers, The Houghton Library, Harvard University. Referenced using the Robin numbering system (e.g., the manuscript folder numbered 1573 in the Robin Catalogue is cited as R 1573). Cited as R.

    i.1867–1893. *The Essential Peirce: Selected Philosophical Writings*, Vol. 1, ed. N. Houser and C. Kloesel (Bloomington: University of Indiana Press, 1992). Cited as EP 1.

    i.1867–1913. *Collected Papers of Charles Sanders Peirce*, Vols. 1–6 ed. Charles Hartshorne and Paul Weiss (Cambridge, Massachusetts: Harvard University Press, 1931–1966); Vols. 7–8 ed. Arthur Burks (same publisher, 1958). Cited as CP.

    i.1872–1878. *Writings of Charles S. Peirce: A Chronological Edition*, Vol. 3, ed. Peirce Edition Project (Bloomington: Indiana University Press, 1986). Cited as W3.

    i.1890–1892. *Writings of Charles S. Peirce: A Chronological Edition*, Vol. 8, ed. Peirce Edition Project (Bloomington: Indiana University Press, 2010). Cited as W8.

    i.1893–1913. *The Essential Peirce: Selected Philosophical Writings*, Vol. 2, ed. Peirce Edition Project (Bloomington: University of Indiana Press, 1998). Cited as EP 2.

    1899.   "cognition", "inference", "concept", entries in *The Century Dictionary and Cyclopedia*, ed. William Dwight Whitney and Benjamin Eli Smith (New York: Century Company).

PEIRCE, Charles S., and Victoria Lady WELBY.

    i.1898–1912. *Semiotic and Significs: The Correspondence between Charles S. Peirce and Victoria Lady Welby*, ed. Charles S. Hardwick (Bloomington: Indiana University Press, 1977). Cited as SS.

PIETARINEN, Ahti-Veikko, Editor.

    2020.   *History and Applications.* Charles S. Peirce *Logic of the Future: Writings on Existential Graphs*, Vol. 1 (Berlin: De Gruyter).

ROCK, Irvin.

    1983.   *The Logic of Perception* (Cambridge: MIT Press).

ROMANINI, Aderson Vinícius.

    2006.   *Minute Semeiotic: Speculations on the Grammar of Signs and Communication based on the work of C. S. Peirce*, University of São Paulo PhD Dissertation. doi: 10.13140/RG.2.2.15852.16008. Also available in elaborated form online: http://www.minutesemeiotic.org/.

ROSENTHAL, Sandra.

    2004.   "Peirce's Pragmatic Account of Perception: Issues and Implications", in *The Cambridge Companion to Peirce*, ed. Cheryl Misak (Cambridge: Cambridge University Press), 193–240.

SANDERS, Gary.

    1970.   "Peirce's Sixty-six Signs?", *Transactions of Charles S. Peirce Society* 6.1, 3–16.

SEBEOK, Thomas A.

    1991.   *A Sign is Just a Sign* (Bloomington: Indiana University Press).

SHORT, Thomas. L.

    2007.   *Peirce's Theory of Signs* (New York: Cambridge University Press).

STJERNFELT, Frederik.

    2015.   "Dicisigns: Peirce's Semiotic Doctrine of Propositions", *Synthese* 192.4, 1019–1054. https://doi.org/10.1007/s11229-014-0406-5

VARGAS, Evelyn.

    2017.   "Perception as Inference", in Hull and Atkins 2019, op. cit., 14–24.

ZALAMEA, Fernando.

    2003.   "Peirce's Logic of Continuity: Existential Graphs and Non-Cantorian Continuum", *Modern Logic* 9.1–2, 115–162.