

Peircean habits and the life of symbols

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Eliseo Fernández

Linda Hall Library of Science and Technology

fernande@lindahall.org

ABSTRACT

Recent reflections by several authors on the evolution of Peirce's conception of the *symbol* have shed new light on this semiotic and logic centerpiece of Peircean thought. Here I use Peirce's equally central notion of *habit* to show connections between these reflections and such currently debated philosophical issues as the notion of emergence, the nature of causation and the recently introduced biological conception of *evolvability*, as well as new developments issuing from the nascent discipline of biosemiotics.

1. Introduction: from dichotomies to trichotomies

We think by making distinctions and, at some point, we even make distinctions among distinctions. One such meta-distinction is that of distinguishing between dichotomies and trichotomies. Of course, Peirce's semiotics—not to mention the whole of his unfinished philosophical system—is based on a sort of ur-trichotomy: the categorical distinction of firstness, secondness and thirdness. Other basic distinctions turn out to be special instantiations of these three —such as that of representamen, object and interpretant, or that of icon, index and symbol. A late and culminating addition to this system, the trichotomy of the emotional, energetic and logical interpretants of a sign, will prove especially important in our discussion.

In Peirce's semiotics, as in other domains of his thought, the third term of the distinction in a sense incorporates aspects of the other two. It provides a form of mediation or participation between the first and second terms, introducing an element of vagueness or continuity that renders it impossible to draw absolute

distinctions between them. Peirce saw in the tendency to postulate absolute dichotomies a characteristic mark of the nominalistic, dualistic doctrines his synechistic realism was destined to supersede.

We have a natural tendency to draw absolute distinctions. They are attractive for various reasons, one of which is that of enabling us to define terms in precise, non-contextual ways in a non-circular manner. This generally works very well for defining properties and things, but often falls short for terms that refer to instances of thirdness (including, of course, the concept of thirdness itself). In these cases we have recourse to impredicative definitions (i.e. definitions in terms of totalities that include in the definiendum an instance of the very term defined). The history of failed attempts to eradicate impredicative definitions from mathematics (by some of the most brilliant logicians and mathematicians of the last century) is quite interesting and instructive, yet outside the scope of this paper. Here it should be enough to remark that the very definition of “sign” in Peircean semiotics is clearly impredicative: the word “sign” appears irreducibly in both the definiendum and the definiens. Impredicative definitions exhibit a kind of circularity (not necessarily vicious), logically related to the paradoxes of self-reference.

In previous work (e.g. Fernández 2010a and 2010b) I have advanced the hypothesis that all instances of thirdness (i.e., of irreducibly triadic relations) exhibit two singular characteristics: they involve **self-reference** (manifested in impredicativity) and embody what I call “**radical temporality**.” By the latter expression I mean the peculiar temporal nature of those relations whose relata cannot coexist in time.

In this brief contribution I would like to apply the first clause of this hypothesis to Peirce’s notion of **habit** in order to clarify, extend and complete some of his insights on the relations between semiotics and the natural sciences.

2. Habits and symbols

Beginning in the late 1880’s the notion of habit grew to become a centerpiece not only of Peirce’s mature semiotics but also of his prescient evolutionary

cosmology. Because of this dominant role, it turned into a unifying link between previously separate strands of his thought.

In mature Peircean semiotics (circa 1907) the concept of habit reached its most exalted role in the conception of the symbol as the most developed kind of sign: one that includes forms of the icon and the index in its constitution. The interpretant of a symbol is a habit. Among the many definitions of the symbol that he had previously offered, the following seems to best convey the idea succinctly:

Symbol. A Sign (q.v.) which is constituted a sign merely or mainly by the fact that it is used and understood as such, **whether the habit is natural or conventional**, and without regard to the motives which originally governed its selection. (*Dictionary of Philosophy & Psychology* vol. 2, CP 2.307, 1902, **emphasis** added).

Later on he provided further clarifications, such as this:

A Symbol is a law, or regularity of the indefinite future. Its Interpretant must be of the same description; and so must be also the complete immediate Object, or meaning. But a law necessarily governs, or "is embodied in" individuals, and prescribes some of their qualities. Consequently, a constituent of a Symbol may be an Index, and a constituent may be an Icon. (*A Syllabus of Certain Topics of Logic*, EP 2:274, 1903)

Peirce's conception of habit grounds his definition of the symbol as the building block of thought and human culture. It also grounds his conception of the laws of physics, the habits that we must impute to nature to render it scientifically intelligible. Consequently, this conception spans a bridge between the traditionally isolated worlds of nature and culture.

Winfried Nöth, in a penetrating analysis of the role of habit in the definition of the symbol (Nöth 2010), cogently remarks:

...Peirce's much broader perspective of the symbol as a sign guided by onto- and phylogenetic habit serves as a synechistic bridge to overcome two dualisms which have prevailed in the history of semiotics, the dualism of culture vs. nature and the dualism of the conventional vs. the innate, i.e., between signs culturally transmitted by teaching and learning and signs genetically inherited and interpreted by instinctive dispositions. Against the dualism culture vs. nature, Peirce proposes that the habit by which symbols are

interpreted is conventional or natural. Against the dualism of the conventional vs. the innate, Peirce postulates that the habit which determines the symbol is an “acquired or inborn” disposition. (Nöth, 84-85).

Natural symbols are currently studied by biosemioticians. One area of active research is the study of alarm calls in mammals. See e.g. Ribeiro *et al.* 2007 and Slobodchikoff *et al.* 2009.

3. Habits, tendencies and dispositions

Given the centrality of Peirce’s mature notion of habit, it is unfortunate that he was unable to develop it beyond some fragmentary remarks. In what follows I attempt to provide a fuller account of this crucial concept through some bold speculations inspired by Peirce’s ideas and the application of some twentieth century discoveries unknown to him.

Currently, an expansive body of literature addresses various neo-Aristotelian approaches to physical causation based on the closely related notions of **tendencies, dispositions, propensities, capacities** and **powers**. These investigations touch on some aspects of the present approach.¹ In the interest of brevity I will leave these intricate discussions aside and only sketch a view of the nature of tendencies and their role in causation. My hope is that this may serve to develop and expand Peirce’s notion of habit (a fuller account and explicit arguments will be included in a forthcoming article).

In current discussions, **tendencies** (by this or another denomination) are usually considered properties of things or processes. This tacitly assumes that properties, things and processes are ontologically and epistemologically more basic, and that

¹ Problems with the received views of causation have led philosophers of diverse persuasions to adopt an ontology of dispositions, powers or capacities. We find among them authors such as Harré, Cartwright, Mumford, Suárez, and many others (see e.g., Harré 1970, Cartwright 1993, Thompson 1988, Suárez 2007, Mumford 2008, 2009).

they could be understood (and perhaps exist) independently of tendencies. Here I propose to reverse this stand and take the notion of tendency as ontologically basic.

Physical tendencies are physical instances of **firstness**. As such they do not exist until they are embodied in the world through the concourse of opposing tendencies (i.e., of constraints tending to limit, eliminate or otherwise coerce their spontaneous exercise). These oppositions are physical instances of **secondness** and their most elemental examples are forces. Forces exist only as pairs of opposite tendencies, an idea that Newton enthroned in the *Principia* as his third law of nature, **action = - reaction**.

I think that things and processes come into existence as a result of the reciprocal constraining effects of tendencies upon tendencies. Things (physical objects) are complex bundles of tendencies kept in approximate balance for relatively long periods of time, as viewed from a human scale.² A wine glass remains similar to itself thanks to a happy balance of intermolecular forces. The same is true for processes or systems of interacting things. The moon keeps orbiting the earth through a similar equilibrium between its gravitational tendency to accelerate towards the system's center of mass and its tendency to move inertially on a tangent to its orbit.

In this view the relative permanence of things is due to the approximate persistence of their immediate circumstances (i.e., the tendencies ready to act in their surroundings). The old wooden chair on which I sit, for instance, would burst into flames and would go up in smoke if the oxygen concentration in the room or the temperature at a small region of its surface were to rise sufficiently. The self-relationality of tendencies is essential to their nature. A tendency without a component meta-tendency—to keep it set on tending—would cease to exist. Tendencies share this self-relational characteristic with instances of thirdness through the mediation of opposing secondness. Tendencies (Peirce's "would-

² According to Peirce: "...What we call a Thing is a cluster or habit of reactions, or, to use a more familiar phrase, is a centre of forces." (CP 4.157, circa 1897).

be's") are dispositions to reach some state that conforms to a general description, to continue doing that in the face of oppositions, and to oppose tendencies that would interfere with that tending. Conflicts of tendencies are usually called "tensions," but this term is also applied to the relative strength of a tendency (e.g., a potential difference [voltage] in an electric circuit).

Peirce defines habit as "a tendency to repeat any action which has been performed before" (Peirce MS 875 of 1883/1884, reprinted in Peirce 1992, EP 1:223). His conception of habit is intimately connected to the equally central notions of **generalization** and **growth**.

... all things have a tendency to take habits. For atoms and their parts, molecules and groups of molecules, and in short every conceivable real object, there is a greater probability of acting as on a former like occasion than otherwise. This tendency itself constitutes a regularity, and is continually on the increase. In looking back into the past we are looking toward periods when it was a less and less decided tendency. **But its own essential nature is to grow. It is a generalizing tendency; it causes actions in the future to follow some generalization of past actions; and this tendency is itself something capable of similar generalizations; and thus, it is self-generative.** (CP1.409, circa 1890, from "A guess at the riddle"), reprinted in EP1: 277, **emphasis** added).

In several of his writings Peirce used the terms "tendency" and "habit" as virtually synonymous. Here I propose that habits, as laws, be regarded as instances of thirdness mediating between embodied tendencies and their surrounding circumstances. **A habit is a tendency to enact the same tendencies every time the same precipitating circumstances are enacted.** In physics these same circumstances are encoded as the same initial conditions in the state of a system. The habit is the law that ensures that the same resulting state will be reproduced every time those same conditions are reenacted. This law in turn is a consequence of a meta-law: the invariance of the laws of physics with respect to time translation. By Noether's theorem this invariance entails the conservation of energy in closed systems, often considered the supreme law of nature.

From the view here proposed habits appear as higher-order tendencies that repeatedly release lower-order tendencies into action whenever similar circumstances are reenacted. Habits are themselves subject to the action of tendencies of an even higher order. Namely, they have a tendency to repetition and a tendency to grow. But beyond these propensities, they labor under a tendency of a supreme order, the self-relational **habit of acquiring habits**. This

supreme habit is the basis of Peirce's mature evolutionary vision. Peirce's synthesis mirrors within its own logical structure the trajectory of this primordial generalizing habit. This higher-order habit arises at the cosmic creation and unfolds through the rise and evolution of life forms onwards to the most recent stages known to us: the growth of symbols into the sprawling branches of human culture and technology.

4. Generalization and Peirce's evolutionary synthesis

Much confusing talk has arisen from Peirce's use of "anthropomorphic" and "mentalistic" notions³ in extending concepts (e.g., "symbol", "mind" and "life") to realms that are evolutionarily antecedent to the phenomena they commonly designate. I think that one important reason for much misunderstanding springs from the fact that many otherwise deep and competent Peirce scholars fail to grasp the import of mathematical inspiration in his work. Absence of interest and appreciation for mathematical ideas, and especially of delight in their beauty is not only pervasive in our culture but is also painfully evident in the attitudes of highly intelligent and educated people. This raises a serious obstacle to appreciating the role of such fundamental Peircean themes as generalization and its related notions of hypostatic abstraction and continuity, in both his semiotics and his cosmology.

As a simple indication, consider how mathematics generalizes upwards, from natural numbers to integers, integers to rationals, rationals to reals, reals to complex imaginary numbers. Each generalization contains the generalized entity as a restricted or limiting case. Quantum physics and the general theory of relativity contain classical mechanics as such a limiting case. The extraordinary heuristic power of Bohr's Correspondence Principle stemmed from the realization of this vital feature of generalization (see e.g. Fernández 1993).

Once in possession of the complex numbers, mathematicians return to the natural numbers to uncover new properties and structures that the application of imaginary numbers reveals for the first time.⁴ We encounter a sort of **backward**

³ For a glimpse of these issues see Bergman 2007 and response in Short 2007.

⁴ A well-known example is the Riemann Zeta function, a complex imaginary function that reveals remarkable patterns in the distribution of prime numbers.

generalization: a natural number becomes a complex imaginary number of a very primitive and restricted form, $(a + 0i)$.

It is possible, and I think fruitful, to envision Peirce's entire endeavor as an attempt to generalize **the very idea of generalization**. Generalization is the idea he recognized as a living impulse of mathematics, the instrument for transforming mere analogies into rigorous synthesizing concepts and theories. We can think of each new stage of cosmic evolution as a "generalization" of previous novelties. We can look at multicellular organisms as generalized unicellular creatures and we can fancy sparrows as generalized dinosaurs. When Peirce says that the symbol is a living sign he is not simply using a metaphor; rather, he is contemplating the possibility of generalizing the conception of a living being so as to include signs as well as oaks or capybaras.

These Peircean extravagances have long been an embarrassment to not a few Peirce scholars. I think the nascent discipline of biosemiotics may turn some of them into a veritable *embarras de richesses*. In effect, biosemiotics includes among its most important tasks a "backward generalization" of some key anthroposemiotic concepts once limited to the human sphere, such as symbol, code, and thinking, and seeks to reveal the actions of their inchoate forms within more ancient and elemental manifestations of living systems. Ideas gained through these efforts may one day climb their way up the Darwinian tree to illuminate some obscure haunts in the lofty abodes of anthroposemiotics.

5. Habits, cosmology, and the logical and final interpretants

Among the various self-relational concepts envisioned by Peirce the habit of taking habits, as a thirdness of thirdness, seems to occupy a supreme position. It was the basis of Peirce's three great achievements, listed below. It was also instrumental in the onset of a fourth one, the integration of the previous three into a highly coherent albeit unfinished synthesis — one that it ought to be our mission to complete, develop and expand.

The first of these achievements was to sketch an evolutionary cosmology that prefigures in remarkable ways the outlines of our present scientific cosmology,

founded on two discoveries unknown to Peirce: the ongoing expansion of the universe and the historical, successive emergence of new physical laws and entities through the mechanism of symmetry breaking, a mathematical rendition of habit-taking and habit-changing (e.g., see Balashov 1992, Christiansen 1997, Fernandez 2010b).

A second achievement was his final realization (in or after 1907) regarding the nature of intellectual concepts, as special cases of symbols and symbolic actions, through the introduction of the concepts of **logical** and **final** interpretants. The logical interpretant is in general no longer a sign, but the acquisition of a habit. The final interpretant is a change of habit.

Says Peirce, after introducing the emotional and energetic interpretants:

[The energetic interpretant] never can be the meaning of an intellectual concept, since it is a single act, [while] such a concept is of a general nature. But what further kind of effect can there be?

In advance of ascertaining the nature of this effect, it will be convenient to adopt a designation for it, and I will call it the *logical interpretant*, without as yet determining whether this term shall extend to anything beside the meaning of a general concept, though certainly closely related to that, or not. Shall we say that this effect may be a thought, that is to say, a mental sign? No doubt, it may be so; only, if this sign be of an intellectual kind - as it would have to be - it must itself have a logical interpretant; so that it cannot be the *ultimate* logical interpretant of the concept. It can be proved that **the only mental effect that can be so produced and that is not a sign but is of a general application is a habit-change**; meaning by a habit-change a modification of a person's tendencies toward action, resulting from previous experiences or from previous exertions of his will or acts, or from a complexus of both kinds of cause. ("Pragmatism, "CP 5.475, 1907, **emphasis** added, variants in EP2: 398-433).

A third achievement promoted by the introduction of the ideas of habit-taking and habit-changing is the final integration of Peirce's semiotics with his mature conception of pragmatism:

Intellectual concepts, ... - the only sign-burdens that are properly denominated 'concepts,' - essentially carry some implication concerning the general behaviour either of some conscious being or of some inanimate object, and so convey more, not merely than any feeling, but more, too, than any existential fact, namely, **the 'would-acts' of habitual behaviour**; and no agglomeration of actual happenings can ever completely fill up the meaning of a 'would-be.' But that the *total* meaning of the predication of an

intellectual concept consists in affirming that, **under all conceivable circumstances of a given kind, the subject of the predication would (or would not) behave in a certain way**, - that is, that it either would, or would not, be true that under given experiential circumstances (or under a given proportion of them, taken *as they would occur* in experience) certain facts would exist, - **that proposition I take to be the kernel of pragmatism**. More simply stated, **the whole meaning of an intellectual predicate is that certain kinds of events would happen, once in so often, in the course of experience, under certain kinds of existential circumstances**. (“Pragmatism,” EP 2:401-402, 1907, **emphasis** added).

As Santaella Braga justly remarks, “When he discovered the role of the logical interpretant in habit and of the ultimate interpretant in the change of habit, Peirce amalgamated the processual nature of semiosis with pragmatism. The evolutionist character of his pragmatism resulted from this synthesis.” (Santaella 2004, my translation).

6. Some concluding programmatic thoughts

In such measure as we may assent to the ideas offered here, we should — under pain of contradiction — apply them to themselves, viewed as an organized totality. We may then be compelled to conceive of such a system as a living and growing intellectual reality in permanent need of assimilating, confronting, or rejecting all new ideas that come into contact with those already at work within its vast and ever-expanding scope. This can only come to pass through the cooperative efforts of persons with strong allegiance to what Peirce names the community of researchers. Those persons will be motivated to participate, within the limits of their personal capacities and inclinations, in order to extend, correct and generalize — in other words, towards evolving — this body of ideas.

For those so inclined, an obvious way to start is by searching the contemporary landscape of ideas for those that show marked affinities, oppositions or other connections to the Peircean corpus, and to investigate how they can fit or fail to fit within it.

Another promising approach is to seek areas of intense current interest in any intellectual field, including science and philosophy, where the application of Peirce’s ideas or their combination with emergent ones may lead to progress. One

such area is biosemiotics, where Peircean thought has exerted a profound influence from its very inception. Earlier in this paper I mentioned scientific cosmology and dispositional views of causation as fields exhibiting these desired characteristics. *Evolvability*, the idea that the capacity for evolving can itself evolve, has been recently introduced in evolutionary biology (see Pigliucci 2008). From a Peircean perspective, it appears to be a special rendition of the habit of taking habits.

Another target for this approach is the notion of **emergence**, an issue that generates remarkable interest and copious research in the philosophy of science. It concerns the spontaneous rise of new properties, entities, processes, functions and (most recently) causes. (Clayton and Davies 2006 and Damiano 2010 are good guides to this field and its vast bibliography). In a recent paper I have advocated a view of emergence based on Peirce's notion of the habit of taking habits (Fernandez 2010b).

Possibly the greatest obstacle to further development and extension of Peircean semiotics is the pervading fragmentation and parochialism that afflict all sorts of intellectual pursuits in our times, especially as they encourage and perpetuate the growing chasm separating the humanities from the positive sciences. In perusing the contents of semiotics journals and proceedings, it is highly discouraging to find a dearth of interest in the great semiotic issues of science and technology. This seems particularly odd at a time when people's lives are so forcefully shaped, for good or evil, by the vertiginous pace of scientific and technological developments.⁵

These novelties that so relentlessly impact our daily lives had their historical roots in the Galilean and Newtonian revolution. It is seldom acknowledged that this was, among other things, a **semiotic revolution**. It consisted in the marriage of **mathematical** theorizing and **instrumental** (experimental) manipulation of nature, through practices of measuring and testing. Allied to experimentation, the

⁵ There are important exceptions, such as Nöth 2002. An excellent review of the most important work in this field and insightful observations on related areas of Peircean semiotics are offered in Nöth 2009.

creation of new semiotics tools (e.g., new symbolic notations and forms of inference) made possible the birth of the new science, the mathematization of motion. As Peirce repeatedly reminds us, scientific instruments especially and artifacts in general are vehicles and embodiments of thought. Since **all thought is in signs** scientific instruments and other experimental tools as well as experimental practices and machines in general are fertile grounds for future semiotic research.

On both sides of the cultural divide there are entrenched tendencies and habits that conspire against the flowering of Peircean semiotics. On one side they manifest themselves as lack of interest, ignorance and antipathy for the endeavors of positive science and mathematics. On the other side, arrogant and myopic scientism leads to similar attitudes. I think we should place our hopes for the enterprise of semiotics in the cultivation of antithetical virtues, developing a loving receptivity to all kinds of ideas, hoping to find them innocent until proven guilty, wishing them to grow and become members of our community. Above all, we should not close our door on ideas that come begging to our doorstep. We should follow Peirce's example: "...It is not by dealing out cold justice to the circle of my ideas that I can make them grow, but by cherishing and tending them as I would the flowers in my garden." (CP 6.289. Evolutionary Love. *The Monist* 3(2) 176-200, 1893).

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