

# Learning *qua* semiosis<sup>1</sup>

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## ABSTRACT

Psychologists of all stripes have struggled to understand the mechanics of the learning process. For Peirce learning is fundamentally a semiotic process-and thus pre-psychological-so that semiotic theorists have a lot to contribute to the analysis of learning in general. In my lecture I will examine five assertions extracted from one of Peirce's most suggestive writings on the nature of learning (from a text entitled "On Topical Geometry, in General," published in *Collected Papers* 7.536, c. 1899): (1) there is an essential relation between learning and the flow of time; (2) learning is a continuous process; (3) learning is virtually reasoning; (4) learning is interpretation; (5) and finally learning is representation, and thus another name for the central category of thirdness. I suggest, among other things, that learning is a process of becoming increasingly more sensitive to all kinds of signs, and that this is accompanied by a growing apprehension of the general conditional laws whose realization shapes the future. These laws, put abstractly, are forms that emanate from the Object to be communicated by the mediating Sign to the Interpretant, one of whose roles is to increase the conditional's antecedent information in order to decrease the vagueness of its consequent, a decrease which is essential if the Object is to be "learned."

Strange is our human condition! As philosophers have shown, particularly Socrates and Plato, we do not know what justice is, but we do talk about it all the time. We are not sure what the word "being" is all about, but here it is, lurking in one guise or another in all of our statements. And so it goes with every significant conception. That of learning is no exception. Painfully aware of our ignorance, we need to learn, all the time, from the day of our birth till the night of our death, if not beyond. What is learning? Straightforward answers are plentiful: increasing knowledge, becoming less ignorant, acquiring a new skill, finding a satisfactory explanation, coming to understand some strange phenomenon. We use the word in all these senses and many more, and there is nothing difficult in apprehending what is meant. Learning is part and parcel of our human experience, and we are all quite familiar with it. "Learning" is just one of those words we use to characterize expediently a permanent dimension of our life, without excessive precision. But as it applies to many varied situations, one may naturally surmise that somewhere must lie a

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<sup>1</sup> This paper is a revised and shorter version of a longer paper published in German in *Zeitschrift für Semiotik*, vol. 22/1 (2000): pp. 11-30 under the title "Lernen, Geist, Semiose."

Special Issue on Computational Intelligence and Semiotics  
*S.E.E.D. Journal (Semiotics, Evolution, Energy, and Development)*  
Queiroz, J. and Gudwin, R. (Guest Editors)

common ground, one that, however vague it may turn out to be, demands careful uncovering and analysis.

In its most frequent usage, learning is tied to the acquisition of knowledge, and thus to an apprehension of reality that strives to become ever closer to it, ever truer. One might dispute that learning, as such, is necessarily connected to truth, but truth here must be taken not in the Latin sense of *veritas* but in the Greek sense, as Heidegger justly insisted upon, of *alêtheia*, as a work of deconcealing the hidden. For Plato, the given of ordinary experience is a veil that needs to be removed, and doing so ultimately leads to an intuitive apprehension of the ideal forms that gravitate in the world of being, well beyond our deceiving world of change and becoming. Knowledge ends up being the *epistêmê* or *noêsis* of stable, untainted, pure abstractions—ideas completely revealed, brought to the light of *alêtheia*, itself an emanation of ultimate goodness. But such intuitive knowledge is the privilege of a very few and highly trained philosophical souls. We ordinary humans are condemned to live chained together at the bottom of the cave, convinced that the world does not extend beyond the shadowy phenomena that are our common lot. “Education,” says Plato via Socrates, “isn’t what some people declare it to be, namely, putting knowledge into souls that lack it, like putting sight into blind eyes. . . . The power to learn is present in everyone’s soul, and the instrument with which each learns is like an eye that cannot be turned around from darkness to light without turning the whole body. . . . Education takes for granted that sight is [in the soul] but that it isn’t turned the right way or looking where it ought to look, and it tries to redirect it appropriately” (*Republic* VII: 518c, d). Ignorance, or *agnoia*, is for Plato the power to look in the wrong direction. Learning is the process through which one becomes aware of the wrongness of that direction and takes steps to remedy it. The whole body needs to turn around; turning the head while remaining chained to the seat at the bottom of the cave will not do.

Learning thus implies constant unlearning. Other philosophers than Plato have expressed the same idea—among them, Charles S. Peirce, for whom learning involves a permanent keeping away from the four barriers that block the way of inquiry: overconfident assertions, claims of unknowability, claims of inexplicability, and claims of infallibility (EP2: 49–50). Peirce may not be a Platonist, but one certainly finds here and there in his writings traces of deep sympathy for the idealism of the Academy’s founder. Plato committed two errors, according to Peirce: the first was seeing the main value of philosophy in its moral influence, and the second was making the acquaintance of pure ideas the whole end of human life. And yet, these two errors balance each other so well that, taken together, they “do express a correct view of the ultimate end of philosophy and of science in general” (EP2: 38). Peirce’s 1898 lecture on “Philosophy and the Conduct of Life” ends with the following words: “The soul’s deeper parts can only be reached through its surface. In this way the eternal forms, that mathematics and philosophy and the other sciences make us acquainted with, will by slow percolation gradually reach the very core of one’s being; and will come to influence our lives; and this they will do . . . because they are ideal and eternal verities” (EP2: 41). The soul’s deeper parts are the realm of sentiment and instinct, the real source of our motivations, the real inspiration for the direction we choose to give our lives. Our instinct is much less fallible than our superficial reason, and is just as much capable of development and growth, which occurs chiefly through experience, especially that part of experience that percolates through the

sift of cognitive reason. Peirce's idea of learning echoes Plato's, even if the sound of it appears somewhat muffled. Peirce thought that the progress of all sciences showed in their getting more and more abstract, in their mathematization. The end of mathematics is to discover the real potential world, the cosmos of which our actual world is only an arbitrary locus (EP2: 40). The real potential world is Plato's realm of ideas, with one essential difference: it is a world that embodies continuity. The ideal and eternal verities are not detached, not discrete, and they are alive: they themselves grow and evolve. Like Plato's goodness, they beget other ideas, but unlike Plato's ideas they take time to mature, and their destiny is subject to the whim of chance. Plato's insistence on the world of ideas as the only legitimate pretender to the title of being forces him to disregard the world in which we live. Peirce refuses that temptation, because he does not entertain Plato's wishful illusion that it is possible for some humans to achieve the *noësis* of ideas, tantamount to the pure intuition of the forms themselves. No intuition, no eidetic reduction à la Husserl is possible with Peirce. Eternal verities are real, independent of what we may think they are, and the whole matter of learning is to get closer to them, indeed. But the means are quite remote from Plato's and his emulators'. "A pure idea without metaphor or other significant clothing is an onion without a peel" (EP2: 392). For Peirce, ideas should not be disrobed, otherwise they vanish into thin air. Covers are essential, but the whole art is to make them as translucent as possible, like onion skin. To this we now need to turn our attention.

In a paper aptly titled "Toward a Peircean Semiotic of Learning," Nathan Houser expressed his belief that Peirce's theory of signs was "of fundamental importance for a correct learning theory," agreeing with Charles Morris that what gave Peirce's semiotic special explanatory power was its "focus on the triadic structure of sign action," one consequence of which was its capacity, as a consistent and even complete theory, to account highly effectively for many obvious facts related to learning, such as the role played by background knowledge, or that played by metaphors and analogies (Houser 1987: 270–71). These are potent claims. That triadicity gives Peirce's theory special power no longer needs defense; it has been sufficiently demonstrated, even mathematically so. Unlike most of his contemporaries, Peirce was a logician who understood deeply the ontological preeminence of logical structures. The first significant paper he published was his 1867 "On a New List of Categories," the result of ten years of arduous logical research, in which he firmly established the universal structure of representation in general. That structure was irreducibly triadic: it involved, first, the isolation of an element that embodied the very ground of representation—an element that carried in itself the power of standing for something else in order to recall its presence (the *quale*, whether it be a monadic, dyadic, or triadic relation); second, another element that had already been represented by the quale-sign prior to the latter's current realization (the *correlate*); and third, an element whose chief duty was to recognize that the current realization belonged to the class of the past realizations such as represented by the correlate (the *interpretant*). One crucial feature of this early analysis of representation was the acknowledgment that no representation could ever take place in a vacuum, that is, that all representations always emerged within a continuum that could not be abstracted from its definition. Also acknowledged was that the main engine of this continuum resided in the interpretant, a

logical element whose principal role was the mediating one<sup>2</sup> of comparison and recognition. Although in later, more mature, definitions of the sign Peirce shifted around some of the main conceptions embodied in the earlier definition (the reference to a correlate, for instance, was integrated within a refinement of the notion of interpretant, and replaced with a call to the Object), this central role attributed to the interpretant was never reneged upon. A third essential feature was the absence of any trace of psychologism in the analysis. That matters of logic antecede those of psychology is a major tenet of Peirce's philosophy, one which psychologists may find difficult to understand even today, especially given the fact that today's psychology is not the science Peirce was familiar with at the turn of the twentieth century. But it is important that we understand this clearly. The representational structure Peirce spent his life describing is mind-independent. When Peirce made the fundamental discovery that all thoughts were in signs, it was a realization that it was not the mind that authored representations, but representations that authored the mind. Signs are the condition of possibility of the mental phenomenon. To understand the life of the mind, one must first understand the life of signs (this is hardly a metaphor for Peirce: let us not forget that signs are not discrete, inert, entities or substances, but dynamic relational structures; we tend not to see them as "alive" (as part of the fabric of a continuum) only because of the deforming lens of our abstractive analysis). And this is precisely the object of logic, or semiotic as Peirce called it. It is only because our only experience of the mental is confined to our own mind, or more broadly to the social mind in which we partake, that it is difficult for us to imagine that there could be a mental-like process that doesn't take place within a "mind" as we know it. But Peirce in many places, whenever he refuses to throw a sop to Cerberus (as he once said when resigning himself to speak of the "interpreter" instead of the "interpretant" for the sake of being at least half-understood), prefers to talk about the "quasi-mind," and this is a technical phrase used expressly to indicate that the more familiar "mind" is only a special instantiation of a more general phenomenon, and that logic, or semiotic, really analyzes not the workings of the human mind, but those of that much more general entity. It is essentially for that reason that semiotic must precede psychology, whether one speaks of traditional "individual" psychology or of "social" psychology. The latter is more semiotically aware than the former, but this does not change the fact that it is still focused on a special instantiation, a social one, of Peirce's broader "quasi-mind." This is Peirce's Copernican revolution, as it were: what we experience as "mind" (whether social or not) is such as it is not because it resorts to signs, but because it is made of signs; to be mental is to be fully permeated with the life of signs. When this life takes a distinctive pattern, then we may call it, for instance, human, as opposed to something else, such as simian. Peircean semiotic is

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<sup>2</sup> That this is a "mediating" role has been objected to on the ground of Peirce's later definition of the sign as that which is determined by an object to determine an interpretant to refer to that same object, so that it is the sign that mediates, not the interpretant. Part of my answer to this objection can be found in my paper "Peirce's Semiotic Monism" (1992), in which I show that each of the three terms in the sign relation (sign, object, interpretant) mediates between the other two, although each does so in its own distinctive way. A sign relation (in the abstract) is a genuine triadic relation for Peirce, and by definition this implies that each term of the relation is a third, and thus of the nature of a medium. Besides that, in the "New List" of 1867, the interpretant must be mediating because without it the predicate could never be a sign of the subject: the copula that unites the two cannot be formulated before the interpretant has done its work of comparison and recognition between the unknown subject and the known correlate.

more a study of the quasi-mind as such than of its accidental instantiations, however tempting their closeness may make them to us. This is not to say that Peirce does not talk about us, of course. He does so all the time, but always from a larger perspective.

That no theory of learning can afford to overlook semiotic is an evidence for Peirce, though maybe not for the rest of us. I want to devote the remainder of this paper to showing why this is the case. Let us do so by examining what Peirce has to say about the nature of learning in an especially revealing quotation from CP 7.536 (“On Topical Geometry, in General,” c. 1899).

All flow of time involves learning; and all learning involves the flow of time. Now no continuum can be apprehended except by a mental generation of it, by thinking of something as moving through it, or in some way equivalent to this, and founded upon it. . . . Thus, all apprehension of continuity involves a consciousness of learning. In the next place, all learning is virtually reasoning; that is to say, if not reasoning, it only differs therefrom in being too low in consciousness to be controllable and in consequently not being subject to criticism as good or bad. . . In order to convince ourselves that all learning is virtually reasoning, we have only to reflect that the mere experience of a sense-reaction is not learning. That is only something from which something can be learned, by interpreting it. The interpretation is the learning. If it is objected that there must be a first thing learned, I reply that this is like saying that there must be a first rational fraction, in the order of magnitudes, greater than zero. There is no minimum time that an experience of learning must occupy. At least, we do not conceive it so, in conceiving time as continuous; for every flow of time, however short, is an experience of learning. . . .

Thus, every reasoning involves another reasoning, which in its turn involves another, and so on ad infinitum. Every reasoning connects something that has just been learned with knowledge already acquired so that we thereby learn what has been unknown. . . . Reasoning is a new experience which involves something old and something hitherto unknown. The past as above remarked is the ego. My recent past is my uppermost ego; my distant past is my more generalized ego. The past of the community is our ego. In attributing a flow of time to unknown events we impute a quasi-ego to the universe. The present is the immediate representation we are just learning that brings the future, or non-ego, to be assimilated into the ego. It is thus seen that learning, or representation, is the third Kainopythagorean category.

Peirce is here holding a discourse that is at once logical and metaphysical, and thus pre-psychological.<sup>3</sup> Five of Peirce’s assertions need to be examined carefully: (1) that there is an essential relation between learning and the flow of time; (2) that learning is a continuous process; (3) that learning is virtually reasoning; (4) that learning is interpretation; (5) that learning is representation, and thus another name for thirdness, the third of Peirce’s three categories.

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<sup>3</sup> Let us remember the principles of his classification of the sciences, whose construction is not simply arbitrary. See EP2: 258–262.

(1) That learning anything takes time is a trivial assertion. But there is here concealed something much less trivial, which is what Peirce wants to convey. Learning is part and parcel of the fabric of time. How so? Included in the idea of learning are those of growth and development (one could affix here the adjective “mental,” but this is unimportant) and thus, at a minimum, that of process. The consciousness of a process is what eminently characterizes cognition (CP 1.381). Now, as Menno Hulswit has recently well observed in his epoch-making dissertation titled “A Semeiotic Account of Causation,” a process, for Peirce, is “a continuous sequence of events, which derives its unity or internal order (distinguishing it from other processes) from a final cause, which directs the sequence to some end state which itself may evolve” (Hulswit 1998: 195). Each “event” in the process is a particular “moment” within it, at a minimum an infinitesimal segment of it, but one that contains enough relational elements so as to be an identifiable part of the process’s internal dynamic history, meaning a part which, as a whole, shows enough internal consistency to be susceptible of abstraction and representation (although that it be actually represented is not necessary). An event cannot be neatly isolated from previous and later events without losing its essential character as an event, a character of “emerging from” and “leading into” which accounts for the continuity of the process. An event is thus not the result of an abstraction out of the flow of time, but a constitutive dynamic element of the flow itself. Peirce makes a sharp distinction between an event and a fact, a fact being precisely what can be abstracted from a slice of time and represented into a proposition by the power of thought. Facts are discrete representations, events are not. A process is a continuous sequence of events, and it receives its peculiar identity (its internal order) from what Hulswit refers to as a final cause. It is one of Hulswit’s major contributions to insist on the undismisability of Peirce’s conception of a final cause. Final causes, he shows, are not future events causing the advent of current events, but general possibilities that may be realized in the future. As such, they are general laws that dictate the general direction particular sequences of events must take so that the process which these events constitute takes on an ever increasing identity as time passes, this identity taking the form of an embodiment of the general idea represented by the final cause. As Peirce explains in “The Law of Mind” (EP1: 331), no general idea can be apprehended in an instant, but has to be lived in time; it permeates each infinitesimal interval of time with its living presence. A general idea determines events in the future to an extent that is not fully predictable. The reference to the future is an essential element of any process. As Peirce says, were the ends of a process already explicit, there would be no room for development, for growth, for life. A final cause only indicates a definite tendency, but has no power to dictate the precise concatenation of actions and reactions that needs to take place in order for the future to come as expected. Hulswit tells us that final causation has two symptoms: (a) the end state of a process can be reached in different ways, and (b) the process is irreversible (Hulswit 1998: 79, 94). If one decides to bake an apple pie, the general idea of a scrumptious apple pie will guide the sequence of actions tending to produce it, but will not dictate precisely which recipe to use, what quantity of what ingredients mixed in what succession, baking time, etc. All of these factors may vary (within the limits allowed by the general idea), but the end result, whether flavored with cinnamon or not, will still be an apple pie, that is, a result belonging to the general type represented in the final cause. And once the pie is baked, there is no way to reverse the process and distillate the original ingredients out of it. The same goes on with learn-

ing, if we agree with Peirce that learning is a fundamental property of anything that grows in time. “Every flow of time, however short, is an experience of learning.” In saying this, Peirce may mean that the essence of learning consists both in the apprehension of the general tendency that suggests a direction to the future, and in the creative implementation or actualization of the perceived suggestion. (Here we begin to grasp in what sense Peirce may have been talking of the percolation of ideal and eternal verities: the nature of this percolation has much to do with the notion of final causation.) If this is the case, then learning becomes a feature of the universe itself, if we accept Peirce’s view that the laws of nature are themselves the product of evolution and are subject to growth. Nature as a whole is the continuous chance-bound implementation of general conditional rules that spell out the possible forms that are offered for actualization. Learning is growing within the limits of a general conditional plan, the nature of which gives a special order and identity to whatever follows it, and the actualization of which creates personality, as Peirce put it in “The Law of Mind,” a paper which he might as well have titled “The Law of Quasi-Mind.”

(2) Learning is a continuous process. Given the above definition of a process, this is evident. But Peirce means more than this. Learning consists in the apprehension of a continuum, and every continuum is a general idea. “Continuity and generality are the same thing. . . . Time and space are continuous because they embody conditions of possibility, and the possible is general, and continuity and generality are two names for the same absence of distinction of individuals” (CP 4.172). When not reflected upon, not a residuum of analysis, experience, as a name for that which constitutes the permanent thickness of life, is a continuum. Any experience embodies conditions of possibility, gives constantly renewed flesh and bones to the phenomenal stream which we call the present. A condition of possibility is a law that has a formal conditional structure: if a certain sequence of events, or process, takes place in an order belonging to some definite class of orders, then the process would end up taking on a certain definite character. Any particular fact (a fact is an aspect of an event that has been abstracted from the flow and put into propositional form) partially fulfills (materializes) a conditional prediction. For example, to suppose that some object in front of us in the dark is red is to suppose that if it were illuminated, its surface would absorb all the wavelengths of light except some of those falling in the red portion of the spectrum. “The most insignificant of general ideas always involves conditional predictions or requires for its fulfillment that events should come to pass, and all that ever can have come to pass must fall short of completely fulfilling its requirements” (CP 1.615). A conditional prediction expresses a law, a certain general order of things, a habit. These laws are real, in the sense that they do cause effects. They are not efficient causes, however, since they have no power to make things happen. But they are final causes, as was seen above. Now, Peirce says that “wherever ideas come together they tend to weld into general ideas; and wherever they are generally connected, general ideas govern the connection; and these general ideas are living feelings spread out” (EP1: 327). The power of generality resides in its governing connections, and connections are the warp and woof of continua. Apprehending the laws governing the connections is what learning is all about. A “living feeling spread out” is the elementary awareness that accompanies the growing connectedness among ideas, the sign that this connectedness is not a random, instantaneous coincidence, but an association obeying a higher telic princi-

ple.<sup>4</sup>This awareness is alive in the sense that not only does it grow, but it also constantly adapts the translation (actualization) of the telic principle to its existential, error-provoking, mutational circumstances. Whatever comes to pass will fall short of fulfilling the requirements, but never completely, and probably decreasingly so, and this, as far as the possibility of an actual universe is concerned, is good enough.

(3) “Learning is virtually reasoning.”<sup>5</sup> All reasoning is learning, and everything else that has the structure of reasoning without one’s being aware of it because it is “too low in consciousness” and thus cannot be criticized or corrected, is learning, too. Why is this so? Because reasoning is a passage from one belief to another. Any reasoning, whether abductive, deductive, or inductive, is composed of a sequence of propositions (premisses) in which some idea that was either not known yet, or at any rate not fully revealed, is brought to light by virtue of transiting through the sequence of premisses. Each premiss represents a belief of some sort, whether particular or universal, and represents it not just as it may stand in itself, but as a claim occupying a well identified position within a larger order. A premiss is a belief that calls forth another one in virtue of its own association with other beliefs already positioned within a sequence whose general identity is dictated by what Peirce at times calls a “leading principle.” The leading principle is the habit of thought which determines the passage from a premiss to a conclusion (CP 3.160). There are different kinds of such habits of thoughts, and Peirce distributed them among the three main kinds of inference: abduction, deduction, and induction. The mingling of premisses prior to the drawing of the conclusion, Peirce calls it “colligation” after Whewell. “Colligation is a very important part of reasoning, calling for genius perhaps more than any other part of the process” (CP 2.442). This is so because once the premisses have been colligated into a compound proposition, the drawing of the conclusion follows quasi automatically, if one knows how to obey the leading principle. So the art of reasoning resides less in drawing the conclusion than in mixing together the premisses: a colligation will be only as effective as the principle that presided over it in the first place. To be effective, ideas that are colligated must not simply coexist, but they must copulate so as to conceive an offspring, which is why Peirce also calls the compound proposition formed by the premisses a “copulative proposition.” Gratuitous copulation may or may not be fertile, but copulation under control has much greater chance of yielding a conclusion. It is therefore important that the colligator gives to the association of beliefs a certain form, a form inspired from those habits of thought that are inferential, because they are the ones most likely to generate new thought, new belief: they are the ones capable of moving

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<sup>4</sup> An interesting idea that may have far-reaching implications for psychologists is that the connection, or “welding together” of ideas into more general ideas, manifests itself into a “living feeling.” Awareness, indeed, must arise at some elementary, but general, level, since learning is an essential attribute of the quasi-mental. A living feeling spread out is a quasi-awareness that holds together ideas, forms, that weld together because they share something essential in common. Whatever so holds together has “consistency” (in the etymological sense), and it is a tenet of Peirce’s semiotic that “consistency” is a mark of representation at work.

<sup>5</sup> Peirce’s use of the word “virtual” here goes on a par with his use of the modifier “quasi” before “mind” or “ego.”



from the known to the unknown. Learning, in this regard, is tightly connected to the art of paying attention to general principles and to let them percolate into one's reasoning.

Now, reasoning is itself a process, and thus it is continuous; time and again Peirce insists on the importance of this. That the entire train of our thoughts is purely inferential cannot be sustained, it is true. But any inference, as such, in its self-containment, exhibits internal continuity, since its connectedness is governed by a general principle. Additionally, the premisses colligated in the copulative proposition have themselves a history. As premisses, they must have been accredited in their representational past, which means, at least, that they themselves were once conclusions of some other inferences, even if only elementary ones, or perceptual ones (i.e., abductive, though not criticizable). No inference is purely isolated: one might say, in a sense, that an inference is a kind of event, as defined earlier, making up an infinitesimal portion of the process known as reasoning. Reasoning as a whole is a continuum somewhat more complex than that of logical inferences, though. Peirce writes:

There is no necessity for supposing that the process of thought, as it takes place in the mind, is always cut up into distinct arguments. A man goes through a process of thought. Who shall say what the nature of that process was? He cannot; for during the process he was occupied with the object about which he was thinking, not with himself nor with his motions. . . . Practically, when a man endeavors to state what the process of his thought has been, after the process has come to an end, he first asks himself to what conclusion he has come. That result he formulates in an assertion, which, we will assume, has some sort of likeness . . . with the attitude of his thought at the cessation of the motion. That having been ascertained, he next asks himself how he is justified in being so confident of it; and he proceeds to cast about for a sentence expressed in words which shall strike him as resembling some previous attitude of his thought, and which at the same time shall be logically related to the sentence representing his conclusion, in such a way that if the premiss-proposition be true, the conclusion-proposition necessarily or naturally would be true. . . . But the self-observer has absolutely no warrant whatever for assuming that that premiss represented an attitude in which thought remained stock-still, even for an instant. . . . Adopting that idea, the logical argument only represents the last part of thought, for the reason that it supposes a premiss which represents some attitude of thought which can only have resulted from thinking. Now if you only break off the last part of a time, you leave a previous time. If you break off the last part of this, you still leave a previous time; and there is no possibility of your breaking off so many last pieces that from what remains no last piece can be broken off. Hence, there is no necessity for a series of arguments representing a course of thought to have a first argument, before which there was no argument in the thought, in the only sense in which there was any argument at all, in the process of thinking. For there is no fact in our possession to forbid our supposing that the thinking-process was one continuous (though undoubtedly varied) process (CP 2.27, 1902).

All sorts of ideas are conceived in the train of thought, no matter whether legitimately (inferentially) or illegitimately. It is never possible to reconstruct faithfully, after a given train of thought has followed its course, all of its successive parts, unless through the simplifying medium of abstraction. Abstraction will let the "self-observer" rethink the

last leg of the thinking trip schematically, distinguishing the conclusion from the premisses. But this will be at the cost of breaking the original continuity; the inferential continuity will be preserved, perhaps, but only as an impoverished icon of the original process. What Peirce says is that reasoning as a whole is part and parcel of the thick continuum of experience, and as such has a vitality and a richness that go far beyond what can be recaptured into words. The poverty of words forces the self-observer to simplify that reality, may lead him to conclude illusorily that sequences of distinct (or discrete) arguments do indeed constitute the fabric of reasoning. Such thinking then leads into making conjectures about the nature of the starting point of the train of thought, the initial argument that originated all the rest, the primal premiss. But this is not necessary. Just as it is fruitless to speak of the beginning point of time, so it is to speak of a starting point for a thinking process. The discontinuity of abstractions may allow it, but only because one forgets that it was an abstraction to begin with. Here, we begin to grasp that another dimension of learning as a quasi-mental property may also have to do with one's becoming aware of the real nature of the passage from the continuum of lived experience to the impoverished continuum of representations (or signs) that strive to reproduce its richer (phaneronic) source.

(4) "Learning is interpretation." This indicates what kind of operation the percolation of eternal verities amounts to much more precisely. That it is in part a matter of reasoning and colligation of premisses has been established. To colligate premisses is to arrange propositions in such a way that they become one unified whole endowed with a copulative power; this power is none other than the power of a sign to determine an interpretant. Peirce explains in many places that the conclusion of an argument is the interpretant of its premiss (the singular can be used to stand for the collections of all premisses). It was in 1866 that he realized this for the first time: "For an interpretant is something which represents a representation to represent that which it does itself represent. Now that which, thus, appeals to an interpretant—that is, is constructed and intended so as to develop a restatement on the part of another or assent—is an argument, a syllogism *minus* the conclusion, for the Conclusion of a syllogism is no part of the argument but is the assent to it, the interpretant" (W1: 478).<sup>6</sup> The propositional concatenation that forms the premiss has become a unified sign, and as such calls forth a new representation, said to be "equivalent" in Peirce's early writings, which when it comes will stamp the premiss with a seal of recognition. This ability to summon up, to appeal to, is what makes the force of a symbol. The interpretant-conclusion restates the colligated premiss under a new form, and imparts to it a "superfluous" increase of information (superfluous because it does not tend to increase either the breadth or the depth of what is contained in the premiss), thereby confirming its meaningfulness. Peirce speaks of an assent, that is, of the interpretant's consent to answer the argument's call. The interpretant is not satisfied with merely re-

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<sup>6</sup> Regarding the question of whether the conclusion is part of the argument, Peirce would later state the following: "As for another proposition, called the Conclusion, often stated and perhaps required to complete the Argument, it plainly represents the Interpretant, and likewise has a peculiar force, or relation to the Interpretant. There is a difference of opinion among logicians as to whether it forms a part of the Argument or not; and although such opinions have not resulted from an exact analysis of the essence of Argument, they are entitled to weight. The present writer, without being absolutely confident, is strongly inclined to think that the Conclusion, although it represents the Interpretant, is essential to the full expression of the Argument" (CP 2.253)

peating the premiss in a contracted form; the “restatement” also includes the affirmation that the representation made by the premiss is similar to that of the conclusion. This is precisely the conclusion’s specific mission: to affirm its equivalence with the colligated premiss. But such an affirmation cannot be made without calling to attention the leading principle that presides over, and gives identity to, the inference. Indeed, a conclusion is not an isolated proposition. To be a conclusion confers upon a proposition a special status, a status that is not immanent to it but transcendent, and that is parallel to the status a sign acquires in becoming an interpretant. What is this status? We find its earliest echo in Peirce’s 1857 study of Friedrich Schiller, which led him to distinguish three “proto-categories” as we may call them, those of I, It, and Thou. In that study, after connecting the I to the Intellect and the male principle, the It to the Sense and the female principle, and the Thou to the Heart and to love, he notices in a footnote (W1: 15n.3) the “remarkable result” that the heart is not the mere conjunction of intellect and sensibility, but the necessary result of their union, just as in arithmetic 7 results from the sum of 3 and 4, without being reducible to their mere addition. Thus, the third element is not simply the mixing up of the two “fathering” elements, but a necessary result that contains an additional element not reducible to their conjunction. The union of the premisses, whether we call it copulation or colligation, is bound to produce an offspring in the conclusion, and this offspring cannot be reduced to the premisses: once born in the continuum, it acquires its own soul and is endowed with its own power of growth. But this new soul, since it descends from the union of other souls, is genetically marked by them. Some element has been transmitted to it according to a genealogical principle. The interpretant is what it is, enjoys the status it has, by virtue of that genealogical element. The fact that it is “equivalent” does not make it “identical” but worthy of pursuing, on its own acquired authority, the transmission of the element that was passed down from the determining signs. One can get to 7 by adding 3 and 4, but 7, as the Pythagoreans understood well, despite its inheritance, has a life of its own. When a conclusion contracts the premisses into itself (with the elimination of mean terms), it becomes a new being, with a past and a future.

If “learning is interpretation,” it then implies the art of begetting new interpretants and of nurturing them so that they can carry on the work of transmission. For this it is necessary that whatever learns becomes aware, or at least behaves as though it knows, that it is a sign. “The word or sign which man uses is the man himself. For . . . the fact that every thought is a sign, taken in conjunction with the fact that life is a train of thought, proves that man is a sign” (EP1: 54). But what exactly is being transmitted, from premiss to conclusion, from sign to interpretant? What does interpretation amount to? Here we must turn to a little known text that is quite suggestive, and of which Hulswit makes great use in his dissertation (1998, 205–207). The following gives the gist of it.

For the purpose of this inquiry a Sign may be defined as a Medium for the communication of a Form. . . . As a *medium*, the Sign is essentially in a triadic relation, to its Object which determines it, and to its Interpretant which it determines. . . . That which is communicated from the Object through the Sign to the Interpretant is a Form. It is not a singular thing; for if a singular thing were first in the Object and afterward in the Interpretant outside the Object, it must therefore cease to be in the Object. The Form that is communicated does not necessarily cease to be in one thing when it comes to be in a different thing, because its being is a being of the predicate. The Being of a Form consists in

the truth of a conditional proposition. Under given circumstances, something would be true. The Form is in the Object, entitatively we may say, meaning that that conditional relation, or following of consequent upon reason, which constitutes the Form, is literally true of the Object. In the Sign the Form may or may not be embodied entitatively, but it must be embodied representatively, that is, in respect to the Form communicated, the Sign produces upon the Interpretant an effect similar to that which the Object itself would under favorable circumstances (EP2: 544n.22, 1906).

What is a “Form”? It cannot be a Platonic Form, which is essentially not communicable unless to some being endowed with intellectual intuition, a faculty whose description finds no place in that of the quasi-mind. It has to be some kind of entity which accommodates not intuitional immediacy, but representational mediacy. It has to be something that can pass from the object into the sign, and from the sign to the interpretant, while remaining in the object and in the sign. It cannot thus be a “thing,” i.e., some primary substance à la Aristotle. It is something that can be embodied “entitatively” in the object, “representationally” in the sign, simultaneously particle and wave, as it were. From the standpoint of the object, the form is the only way it has to attract attention to its very self, and thus it has to be some essential character that is fully realized in the object, so much so that, as Peirce says, it is “literally true” of it. The object here spoken of is what Peirce calls the dynamic object, that is, that which, being external to the sign, is never immediately given within the sign, but can only be suggested by the sign through the process of interpretance. The dynamic object, as Hulswit has shown well, exerts three different kinds of “influence” on the sign depending on the latter’s nature. If the sign is iconic, the object that determines it is a “necessary condition” of it; if the sign is indexical, the object that determines it acts on it as an efficient cause; and if the sign is a symbol, the object that determines it is a final cause of it (Hulswit 1998: 161–167). The form that is thus transmitted from the object to the sign can take different guises, whether the object is a possible, an actual occurrence, or a conditional necessity. For the sake of clarity, let us consider an example.

The track left by a deer in the snow is a sign that contains both iconic and indexical elements. As an icon, it reproduces the inverse shape of the bottom of the deer’s hoofs with great fidelity, so that the actual shape of the hoofs is a necessary condition of the shape left in the snow. As an index, the track is the physical effect of the deer’s walk through the snow. The index bears all kinds of elements, such as freshness, size, depth, sharpness, distinguishable parts, which will indicate to the experienced tracker precious information about the animal’s age, weight, sex, species, habitual behavior, destination, and probable whereabouts. To the inexperienced observer, the track will simply indicate the earlier presence of some hoofed animal on that particular spot. The sign will thus be more iconical, but especially more indexical (since it is as an index that the hoof track is semiotically more potent), to the experienced tracker than to the inexperienced onlooker who can only recognize the vague shape of a hoof without being able to identify its origin with any precision. Icons, Peirce says (EP2: 8), bring with them a *capacity* for experience, but that capacity can only be exploited within the limits of the actual experience the interpreter has already had of the world in which the sign appears. The track’s indexicality increases with the interpreter’s experience. The same goes on with photographs: the portrait or landscape they represent can only be recognized by people who have had the

requisite experience (it takes more of it to recognize Brussels in a picture than just a foreign city). This is not to say that indexicality always requires a more sophisticated experience (richer collateral observation, to use Peirce's phrase) than iconicity in order to exert its power more effectively on the interpretant. In order to be recognized, icons often demand considerably subtle and supple power of discrimination, too, and as long as one has never seen a hoof in one's life, one will never be able to connect the snow track to a hoof, a fortiori to a deer's hoof. Thus iconicity also increases with experience (as does symbolicity). Experience, therefore, will tend to sharpen the sign's recognition, to magnify the sign's presentation so that, once encountered, it starts talking to us not only more volubly, but also more precisely. Nevertheless, as Peirce intimates, the representational process starts with iconicity first: there are no signs that do not embody, minimally, icons in their make-up. A hoof track as such will never indicate anything if it is not first identified as a hoof track (regardless of the vocabulary, of course, which is a symbolical affair). To the ignorant who has never seen a hoof, the track may simply be a series of little holes in the snow, which as indexes indicate that something must have caused them to appear, but before this can be inferred, the recognition of the holes as holes must first have been made. If learning is a matter of increasing one's ability to make out signs, it begins with the ability to make out icons, and then, as soon as possible, to make out indexes out of the iconic simplex, and symbols out of the iconical-indexical complex. An index without an icon is blind, a symbol without an index is empty. Pure indexes and pure symbols do not occur, except within the abstract classification of semiotic theory, where their isolation is of course most convenient.

“In respect to the Form communicated, the Sign produces upon the Interpretant an effect similar to that which the Object itself would under favorable circumstances.” Favorable circumstances would lead to the deer's own direct apparition to the observer, for instance. Gone are the hoof tracks, *ecce cervus*. Again, only an experienced hunter will be able to tell the age of the animal, its species, etc. The inexperienced wanderer will only be able to tell “there is a deer,” or, if afflicted with greater ignorance, “there is a hoofed animal.” So, the sign produces upon the interpretant an effect “similar” to that of the potential apparition of the object stood for. The object's own apparition is of course much more revealing than the hoof track, so that the effect is only “similar,” not “identical,” which is why we bring our children to the zoo. The “form” is not the animal on display itself. It is something that can move from the deer to the hoof track to the interpreter's mind. Its matter is thus that of an idea, an “idea-potentiality” endowed with a double power of growth and embodiment (EP2: 388). Peirce says that the being of the form consists in the truth of a conditional proposition. The hoof track tells us “under favorable circumstances, you would be able to see a five pronger.” It may tell us more, or less, depending on our familiarity with the sign (our “collateral experience” as Peirce says elsewhere). The idea can thus grow, in proportion to the quality and richness of its interpretance. The “favorable circumstances” have as much to do with the art of walking silently against the wind than with our being accompanied with an experienced hunter or our having studied relevant books about deer. What is significant is that a sign carries primarily a potential experience, the source of which comes from the dynamic object—and let us remember that *dunamis* means power, in the sense of a source of actualization of events. The object determines the sign by making it a carrier of that power, as manifested in the

conditional proposition. The form will only be as effective as the extent to which the conditional proposition can be realized. The being of the form is a matter of truth, which means that the object behind it must *really* carry it in the first place. Let us imagine that the hoof tracks are false: some practical joker planted them there by walking on stilts, the bottom of which he had artfully crafted to imitate hoofs of a five pronger. Despite all his experience our good hunter is fooled, and led to believe that an actual five pronger was walking there just a few minutes ago, and is probably now hiding in the bushes a few hundred yards away. Following the tracks to their end, how surprised he is to discover a new species of hoofed mammal, laughing at him! Not the least indignant, our good hunter embraces the practical joker and thanks him profusely: “How much have I learned, thanks to your good trick! All my experience had not prepared me for this, but now I am glad to see it greatly increased with this remarkable addition to the possibilities of interpretance. This worked so well that I am awfully tempted to turn you into a stuffed animal—such a rare specimen to add to my collateral collection!” The form embodied in the stilted joker was not the form the hunter was led to expect through his habitual interpretance of the sign, but that was only because of his ignorance of the deceitful ways of the world. The conditional proposition did not turn out to be false, but simply needed some revising: “under favorable circumstances, you would be able to see either a five pronger or some other thing capable of leaving behind it the same kind of track.” This is how the idea-potentiality grows. Learning, therefore, is a matter of enlarging the field of interpretance through the test of experience. As soon as such a test forces upon us a new interpretation, this interpretation, once completed, becomes a part of our “collateral experience” and can thus serve to increase a sign’s power of suggestion. One reason we never get tired of rereading great works is because, between each reading, we continue to experience life in all its variety, and each experience increases our sensitivity to signs. Increased sensitivity means increased interpretability, and vice versa. There is no limit, potentially, to this process. And so we can now start to see that what we call learning, vaguely but assuredly, must be directly connected, in whatever guise it may take, to a growing “semioticity” (to speak generally), to an increasing openness to all kinds of signs, not only from the standpoint of their recognition and interpretation, but also from the standpoint of their own creation and refinement. For, within the sign relation, interpretants have the power to reshape the signs that determined them so as both to preserve and to continually enhance that determination, for the sake of the object.

Now, once a dynamic object has infected a sign with its form, how does that form move from the sign to the interpretant? “The sign not only determines the interpretant to represent (or to take the form of) the *object*, but also determines the interpretant to represent the sign” (EP2: 477–78). As Hulswit shows, the determination the sign exerts upon the interpretant is akin to that of an efficient cause. This is the case whether the sign is iconical, indexical, or symbolic. The interpretant is effected by the sign, and this conveys an idea of irresistible forcefulness in the connection. Indeed, let us not forget that the sign relation as a whole is irreducibly triadic, and that a sign is not a sign if there is not ipso facto, burned within it, a direct appeal to an interpretant. The sign, however, “determines *that* (under favorable circumstances) an interpretant will be created, but not *what* the interpretant will be. *What* the interpretant will be, is determined by the final cause of the semeiosis process” (Hulswit 1998: 165). An interpretant is a sign in triadic reaction with

the sign that generated it. Within that reaction, the interpretant must (1) acknowledge receipt of the form that originated in the dynamic object, (2) acknowledge that this form, as received, took on a certain representational shape forced upon it by the mediating sign, and (3) add to that form a sign of recognition, that is, acknowledge that the form as received is not foreign to the interpretant, but on the contrary already familiar to it in one way or another. This is crucial: an interpretant that has no familiarity with the form that transited through the triadic relation would be out of place in that relation, and would not fulfill its proper significate function. It is part of the interpretant *qua* interpretant to have the competence required for carrying on the semiotic process. That competence amounts only to its capacity to connect the form as received to other *comparable* instantiations of that form, instantiations that have already been identified, and whose established identities will, on the one hand, allow the recognition to take place, and will, on the other hand, be themselves enhanced by the new experience brought about in the interpretance. How does the recognition process work? It varies, according to the nature of the form that is being transmitted, and thus also according to the form of the transmission itself.

Shakespeare, at the beginning of the last act of *A Midsummer Night's Dream*, has Theseus pronounce verses of the highest semiotic import: "And as imagination bodies forth | The forms of things unknown, the poet's pen | Turns them to shapes and gives to airy nothing | a local habitation and a name." Translated into semiotic jargon, this gives, with a small addition at the end: "And as the semiotic fabric manufactures signs specially fitted to embody the forms transmitted by dynamic objects, the power of interpretance takes due notice and generates interpretants capable (1) of matching these signs with the right kind of collateral experience, (2) of discovering the identity of the forms being carried," and (3) of transmitting in turn these recognized forms to further interpretants. Signs carry forms, and forms are an object's only chance to manifest itself, attract attention, and enter the realm of knowledge. Learning is in great part a matter of apprehending such forms, of being able to give them a "local habitation," i.e., of finding out how they relate to settled experience, and then of giving them "a name," i.e., of embodying them into new signs, ones that do them greater justice than the initial ones. Interpretation consists precisely in this kind of continuous activity: finding and/or devising signs whose body gives the transmitted forms ever-increasing manifestation, always for the sake of the original dynamic object—the power that keeps feeding the whole process of semiotic determination throughout. As has been suggested, there are three kinds of determination: necessary condition, efficient causation, and final causation. To these correspond three kinds of transmittable forms, monadic, dyadic, and triadic, and three types of carrier signs, iconic, indexical, and symbolic.<sup>7</sup> One can thus surmise that there are at least three general types of conditional propositions that the process of semiosis keeps uttering with increasing definiteness. And Peirce intimates that learning has also to do with apprehending the truth of such propositions.

(5) "Learning is representation, and thus another name for thirdness." Our discussion of the fourth assertion has already taken care of most of what is contained in this fifth as-

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<sup>7</sup> I am simplifying on purpose here, given the short space. Peirce's categorial classification of the signs allows for a far more subtle analysis, of which I can only here suggest the general direction. The reader will forgive this necessary sop to Cerberus.

sertion. To say that learning is thirdness is to make a clear metaphysical claim—a claim about the very structure of reality. It is a powerful generalization, and a logical conclusion, to what has been said. What is learning? No psychological answer will do justice to the question. We must dig much deeper. Semiotic can help us uncover much of what learning entails. But even a semiotic discourse about learning, however general and far-reaching, will not do justice to it. Learning, Peirce tells us, is another name for the third of the three categories of thought and nature. Whether we call it representation, mediation, continuity, growth, evolution, we are always dealing with slightly different but interdependent aspects of the same dimension of reality. If learning is an intrinsic part of our human life, it is because it is in the first place an intrinsic dimension of the universe itself. To put it in Socratic terms, the universe doesn't know itself, knows it, and deals with it. How does it deal with it? In myriad ways, one of which is in allowing the human experiment to emerge and follow its course. "Man is a sign": we are fundamentally semiotic beings. Semiosis defines our essence, and so we learn, and our learning is itself an emanation of the universe's own learning. Its eternal verities are eternal because they never finish shaping themselves out, which they do by determining—or percolating through—the signs that we, among others, are then bound to learn to read. And as we read, we keep turning the pages of a book of which we all share the authorship, though not the ultimate one.



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