Published in *The Iconic Page in Manuscript, Print, and Digital Culture, University of Michigan Press,* 1998.

Iconic Indeterminacy and Human Creativity in C.S. Peirce's Manuscripts

Mary Keeler
University of Washington

The manuscripts of Charles Sanders Peirce (American philosopher and scientist) not only vividly demonstrate the thesis of the Iconic Page (as indicated by George Bornstein and Teresa Tinkle), but also on these pages Peirce rendered the first and most thorough theoretical account of the essential iconic requirement for any effective representation to be valid and reliable in the conduct of inquiry. His *semiotic*, or theory of how human experience *grows* by means of the mediating structures we create, fully supports those emerging textual-editorial claims that meaning is "carried not only by the words (the 'linguistic code') but also by the material features of the text such as layout, illustration, size and kind of lettering, use of space, binding, cost, and the like (known collectively as the 'bibliographic code')." Peirce's pages not only exhibit the "integration of the iconic or semantic features of the physical text with more traditional and purely linguistic considerations," but they preserve the evidence of his labors to explain why such a comprehensive view of representation is logically and pragmatically necessary to human creativity and the growth of knowledge.

We find the word "icon" (and its derivatives) in the Western vocabulary at least since the Greeks (and in English since the sixteenth century), but Peirce first employed it, in 1884, as a theoretical term in the new philosophical perspective (semiotic) that his earlier work on pragmatism as a method of inquiry had indicated he must develop. Before attempting to explain how his perspective responds to the theme of this volume, I will examine some of the bibliographic challenges of his corpus, which derive from the demands of his theoretical explorations into what he called the "iconic and indexical conditions," or the "grounds," necessary for any effective symbolic meaning to occur in human experience. I begin with a brief account of the nature and scope of his writings and the current state of access to them.

The largest part of Peirce's most important scientific output was published as part of some 10,000 pages of his work printed during his lifetime (1839-1914); but most of his philosophical writings (over 70,000 manuscript pages archived in the Houghton Library at Harvard) remain unpublished, except in 30-year-old microfilm. The misleadingly named *Collected Papers of Charles Sanders Peirce* (published in six volumes 60 years ago, with two additional volumes in 1958) contains about 150 selections from his unpublished manuscripts, only one-fifth of which are complete: parts of some manuscripts appear in up to three volumes and at least one series of papers has been scattered throughout seven. A more recent attempt to publish his work, *Writings of Charles S. Peirce: A Chronological Edition,* has succeeded in issuing only five volumes in twenty years of work and, even if the edition is

completed, its projected 30 volumes would represent less than one-third of the entire Houghton collection. Most discouraging of all, the print format cannot cost-effectively present his progressively more graphical and colorful work: manuscripts filled with symbols and complicated graphics and crucially meaningful color, in both words and diagrams. Peirce produced his most intensive theoretical work, including his system of graphical notation for the study of logic (called "Existential Graphs"), during the last 17 years of his life—on at least 40,000 pages, or nearly half of the Houghton collection, less than 10% of which has ever been published.

Peirce worked nearly 30 years as mathematician, scientist, and computer for the U.S. Coast and Geodetic Survey, to advance the physical sciences by experiment and theory development. He designed instruments to measure the force of gravity and to define the shape of the Earth and the Milky Way, he was the first to state the length of the meter in terms of a wavelength of light, and he significantly contributed to the worldwide effort to establish measurement standards as the basis upon which researchers could rely when comparing the results of their investigations. Peirce was also (with several Europeans, including Boole, DeMorgan, Schroeder, and Frege) a co-developer of the relational logic that underlies modern computer language theory, and (in an 1886 letter to his former Johns Hopkins student Allan Marquand, then at Princeton) he sketched what may be the first conception of an electrical circuit to be used for logical functions. The full scope of his research includes biology, psychology, statistics and probability, mathematics, astronomy, chemistry, physics, geodesy, comparative biography, criminology, cartography, economics, philology, religion, metaphysics, and ancient, medieval, and modern history and philosophy.

His scientific work convinced him that absolute accuracy is unattainable, which led him to conceive pragmatism as a method of inquiry (in terms of increasingly refined investigations with truth as the logical limit) that depends on communication among participants in collaboration to make sense of their individual views jointly—as explained by his theory of inquiry (semiotic).

The semiotic perspective views the primary challenge of any science as the mediating effort to resolve the many different observations (views or experiences of some phenomenon) that are possible, by continuing to formulate and test hypotheses (or representations of these views), with some hope that these views can be brought together to form a valid and reliable interpretation from which investigation can proceed. Effective inquiry proceeds only through cooperation of individuals working to represent their experience (or express their views), thereby creating a viable community that can give each member a broader perspective (in a collective experience) but which can remain vital only through continued individual contributions, to be compared and comprehended in the evolving collective representation of

knowledge. Trying to overcome the solipsism or individualism (nominalism) that characterizes both rationalism and empiricism, Peirce (based on his own experience as a working scientist) developed his semiotic and pragmatism to account philosophically for *a community of inquirers* as what makes knowing possible.

> The real, then, is that which, sooner or later, information and reasoning would finally result in, and which is therefore independent of the vagaries of me and you. Thus, the very origin of the conception of reality shows that this conception essentially involves the notion of a COMMUNITY, without definite limits, and capable of an indefinite increase of knowledge. (*W2:*239)

Peirce's ideas have had foundational influence in the American philosophical tradition, which has since been developed by James, Dewey, Royce, Mead, Quine, Morris, Chomsky, Rorty, and Putnam, and his ideas continue to grow in relevance to topics in more recent fields of intellectual development: such as machine intelligence, cognitive science, topographical (graphical) logic, abductive logic, probability theory, the theory of representation and communication, the coordination of graphical (iconic) and verbal (symbolic) understanding, and postmodernism in the arts and in critical theory. And yet, although Peirce is credited with being the father of America's only indigenous philosophy (Pragmatism), his friend William James and his student John Dewey enjoy a much greater reputation, with much more nearly complete editions of their work. Even with great improvements in archival collections throughout the United States, eighty years after Peirce's death, we have no effective access to the extraordinary breadth and depth of his work.

All the evidence in Peirce's manuscripts (see a more extensive account, by Keeler and Kloesel, in David Greetham's *Margins of the Text*), from his editorial marginalia to his elegant logical and mathematical diagrams, indicates that Peirce himself recognized the limitations of the traditional theory of text in terms of "linguistic code" (although he did not refer to it as such). Even a brief glance through the archive would convince anyone of its representational complexity: text enclosed in graphical figures, graphics embedded in text, text contoured around graphics, whole pages of graphics with no text at all, and graphical figures with as many as four colors ("since four tinctures are necessary to break the continuity between any two parts of any ordinary surface" [CSP-MS 295, p. 44]) used to make critical distinctions (see figure 1).

Those who have experienced the effort of scholarly work based on the manuscript collection have become aware of other difficulties that must be considered "iconic," in Peirce's terms (as we shall see), which result from his compositional style and the fate of his corpus after his death. First, his writings cannot be conveniently arranged in topical order. Because of his broadly polymathic training and abilities, Peirce's work in mathematics, logic,

and experimental science discreetly influenced his work in philosophy and the humanities, generally, which in turn shaped his views on scientific inquiry. The disciplinary specialist who studies his ideas can never be sure where, in the entire manuscript collection, a particular topic will be mentioned or woven into an unexpected context. Peirce's writings and diagrams served as an aid to the progress of his thoughts as he communicated with himself (his manuscripts are full of imaginary dialogue, in which he often plays the part of his own critics) [see note]. He would explore the implications of an idea thoroughly, without regard for the arbitrary limitations required of type-set text and bound volume as a medium of communication.

> My aversion to publishing anything has not been due to want of interest in others but to the thought that after all a philosophy can only be passed from mouth to mouth, where there is opportunity to object & cross-question & that printing is not publishing unless the matter be pretty frivolous. (*SS* 44)

Shea Zellweger has attempted to map the "topological course" of such explorations in the order of his manuscript pages (for example, see figure 2).

Finally, perhaps the most challenging bibliographic difficulty of all is that the Houghton archive contains several thousand "lost pages," that is, pages separated from their original manuscript context. When Peirce's papers were given to Harvard, shortly after his death (1914), they were not properly stored for several years (apparently, even distributed as scratch paper in war-time paper shortages!), during which they fell into disarray. Microfilm and photocopies offer little hope for their proper re-placement, which depends on careful matching of any discriminating features that might be clues as to where they belong (such as color and width of ruled lines, type of paper, watermark, pattern of a torn edge, weathering effects, and so on). (The full range of these features may be imagined in the appearance of figure 1, and its color original.)

Because of the comprehensive and complex conceptual nature of Peirce's work (and the difficulty of access to its holograph expressions), it has been interpreted piecemeal by most scholars. British philosopher Christopher Hookway, who has worked extensively with the manuscripts, explains the limited progress of Peircean scholarship as it appeared in 1985 (with little improvement in the decade since), when he began work on a comprehensive introduction to Peirce's philosophy:

> Many people share the opinion that Charles S. Peirce is a philosophical giant, perhaps the most important philosopher to have emerged in the United States. Most philosophers think of him as the founder of 'pragmatism' and are aware of doctrines—about truth and meaning, for example—which they describe as 'Peircean.' But, curiously, few have read more than two or three of his best-known papers, and these somewhat unrepresentative

> ones. On reading further, one finds a rich and impressive corpus of writings, containing imaginative and original discussions of a wide range of issues in most areas of philosophy: he appears to have anticipated many important philosophical discoveries of the last eighty years. . . . [H]e brought together a number of different philosophical doctrines: the new logic of relations and quantifiers invented independently by Frege in Germany and Peirce in the United States; sophisticated insights into the structure of science and the logic of probability; a systematic theory of meaning and interpretation; a developed philosophy of mathematics; a general theory of value; and a metaphysics incorporating an ambitious evolutionary cosmology. It is not wholly surprising that he is not read more widely. . . . He never produced a unified coherent presentation of the system. We have to work from a mass of papers, sets of lectures notes, reviews, and manuscripts, and on that basis—helped by his many programmatic statements—reconstruct the structure and development of his system. (Hookway: ix)

With full and effective access to his corpus, scholars could trace the evolution of Peirce's philosophy from its origins in his early (published) essays, where they now struggle to grasp the most awkward forms of its expression, through its eloquent later expressions, based on his semiotic perspective and demonstrated in diagrammatic form. His graphical logic was never completed, and we have only indications of what its iconic nature contributes in the development of his philosophical perspective to cover the whole range of intelligent inquiry or associative thought for any "intelligence capable of learning by experience" (MS 798; *CP* 2.227 [1897]). Peirce himself described the stage of his progress in 1907:

> I am, as far as I know, a pioneer, or rather a backwoodsman, in the work of clearing and opening up what I call *semiotic*, that is, the doctrine of the essential nature and fundamental varieties of possible semiosis; and I find the field too vast, the labor too great, for a first-comer. (MS 318; CP 5.488 [1907]).

Peirce's Philosophical Perspective

From the historical viewpoint, we can appreciate Peirce as a great philosophical synthesizer who carefully constructed his philosophical perspective from the extensive study (in the original texts) of all previous Western traditions (Greek, Medieval, and Modern) in order to reconcile their differences at their unexamined (dogmatically adopted) *metaphysical* foundations, which commit even modern science to confusion about meaning. "Find a scientific man who proposes to get along without any metaphysics . . . and you have found one whose doctrines are thoroughly vitiated by the crude and uncriticized metaphysics with which they are packed" (MS 328; *CP* 1.129 [1905]). In his account of Peirce in *The Johns Hopkins Guide to Literary Theory and Criticism,* Leroy Searle explains why Peirce's philosophy fundamentally challenges the prevailing attitude and condition of modern philosophy—and its effect on science:

> While philosophical commentators may wish to "ignore the metaphysical side of Peirce's thought" (*Nauta* 121), it was crucial for Peirce, whose persistent complaint about metaphysics since René Descartes was that it was unclear, self-contradictory, or confused—not that one could get rid of it or otherwise deconstruct it. His turn to Duns Scotus, the subtlest medieval defender of realism, combined with his study of Kant, led to a version of critical realism in which he rejects the nominalism he finds in virtually all modern philosophers since Descartes (*CP* 1.18-19).
>
> In general, Peirce took the view that 'nominalism' involves a metaphysical reduction of modes of reality to the existence of individual entities (*CP* 1.21), thereby hopelessly obscuring the dependence of thought and inquiry on diverse forms of representation and so ensuring in all intellectual pursuits, but especially in experimental science, a chronic state of crisis or confusion over the status of truth claims, as well as the proliferation of destructive and not merely critical forms of skepticism. (559)

In a 1907 letter to the editor of *The Nation* (which was not published), Peirce delineates the genesis and growth of (his own) philosophy, which begins:

> Any philosophical doctrine that should be completely new could hardly fail to prove completely false; but the rivulets at the head of the river of pragmatism are easily traced back to almost any desired antiquity.
>
> Socrates bathed in these waters. Aristotle rejoices when he can find them. They run, where least one would suspect them, beneath the dry rubbish-heaps of Spinoza. Those clean definitions that strew the pages of the *Essay concerning Humane Understanding* (I refuse to reform the spelling), had been washed out in these same pure springs. It was this medium, and not tar-water, that gave health and strength to Berkeley's earlier works, his *Theory of Vision* and what remains of his *Principles*. From it the general views of Kant derive such clearness as they have. Auguste Comte made still more—much more—use of this element; as much as he saw his way to using. Unfortunately, however, both he and Kant, in their rather opposite ways, were in the habit of mingling these sparkling waters with a certain mental sedative to which many men are addicted. . . . I refer to the habit of cherishing contempt for the close study of logic. (MS 318; *CP* 5.11)

Although Peirce is now often regarded as one of the last great nineteenth-century polymaths, he always considered himself to be a logician—though in a much broader sense than we use that term today. He developed his semiotic view as a general theory of logic, representation, meaning, experience, learning, and inquiry to explain how self-critical conduct (learning by experience) is possible: "Logic, in its general sense, is, as I believe I have shown, only another name for *semiotic* (σημειωτικη)" (MS 798; *CP* 2.227 [1897]). He formulated his pragmatism as the guide for achieving this conduct, and he proposed his Existential Graphs as an instrument of logical notation for demonstrating the effectiveness of this procedure. His more than fifty years of work issued a philosophical perspective that establishes the growth of meaning (its *continuity*: tendency to evolve, rather than simply to increase haphazardly) as the fundamental condition of human experience.

Peirce's philosophy grounds and expands the traditional view of logic (which had not been significantly developed since the treatises of Aristotle) to account for the normative conditions of human experience (involving beliefs, interpretations, and assumptions). Traditional logic is inadequate largely because it conveniently ignores the *metaphysical problem of reference*, by which we establish our experience of existence or identity in terms of abstract concepts. Full logical analysis would include "consideration of the conditions which must be supposed for man and his environment if he is actually to obtain knowledge by participating in the process . . . . [T]he faculties of knowledge as the necessary conditions of the knowing subject must be examined first, rather than the objects of knowledge in themselves independent of such conditions" (Thompson, 37). For Peirce, experiential phenomena (including feeling, consciousness, ideas, and thought) fit into an evolutionary cosmology and are no different in kind from other phenomena in the universe—which must be explained more comprehensively to *account for* mind, rather than be reduced to 'nothing but' matter. Continuity characterizes the *negentropic tendency of living matter* (which we can observe as *evolution* in biology and as *sense of purpose* in intellect) (see MS 423; *CP* 4.121 [1894]), whereby the possibility of systematicity (or regularity) results from conditions of chance, or irregularity:

> Supposing matter to be but mind under the slavery of inveterate habit, the law of mind still applies to it. According to that law, consciousness subsides as habit becomes established, and is excited again at the breaking up of habit. But the highest quality of mind involves a great readiness to take habits, and a great readiness to lose them. (*CP* 6.613 [1893])

Peirce proposed that logic finally be developed as a genuine science of reasoning, in the *tri-relative* terms of semiotic, with three branches: abduction, induction, and deduction. (Abduction refers to the creative effort to formulate hypotheses, or guesses, that represent how conditions in the world must be in terms of facts, or relations among objects, to render any body of data conceptually explicable.) These three branches of logic, then, can be used to investigate the conduct of creating, testing, and validating representations and, together, they account for the effective formation of concepts as explained by his semiotic and described by his pragmatism. Existential Graphs is a formal notation for his logic (or a "topology of logic"; see Zeman, 27), which he called "moving pictures of thought," intended to provide a diagrammatic means of observing and carefully building the rational component of inquiry to match (or balance) what sophisticated instruments and techniques have given empirical investigation for critical control in examining evidence (MS 291 [1905]).

> [T]he intricate forms of inference of relative logic call for such studied scrutiny of the representations of the facts, which representations are of an *iconic* kind, in that they

> represent relations in the fact by analogous relations in the representation, that we cannot fail to remark that it is by *observation* of diagrams that the reasoning proceeds in such cases. We successively simplify them and are always able to remark that such observation is required. (*CP* 3.641 [1902])

In trying to grasp Peirce's philosophical perspective, we might take counsel from veteran scholars, such as the late Vincent Potter: "The obvious is usually the most difficult thing to grasp and, when grasped, even more difficult to express" (Potter 1996:177). And Vincent Colapietro observes, "Peirce can help us think through traditional philosophical issues in a manner that, at once, drives deeper roots into our intellectual tradition and demands critical engagement with contemporary developments" (in Potter 1996: ix). Toward the end of his life, Peirce came to call his philosophy "Critical Common-sensism," which "uses the most rational methods it can devise, for finding out the little that can as yet be found out about the universe of mind and matter from those observations which every person can make in every hour of his waking life" (MS 328; *CP* 1.126 [1905]). These observations reveal that we are, primally, creatures who can form hypotheses, which Peirce considers to be "spontaneous conjectures of instinctive reason" (MS 841; *CP* 6.475 [1908]). His theory of inquiry (or logic as semiotic) attempts to explain how instinct evolves into intellect and to examine our reasoning capability from its most vague to its most precise.

Ultimately, he built the philosophical view needed to examine how intellectual growth occurs. Knowledge, to be vital and viable, must evolve from the progressive resolution of the diversity of our individual experiences of the world through continued collective inquiry by means of communication; otherwise, what we call knowledge will be established by dogmatic authority or naive public opinion. His semiotic gives us a theoretical view from which to examine the esthetic, ethical, and logical basis of the self-critical control necessary for collective experience (knowledge) to progress effectively (validly and reliably). Together, semiotic logic and the pragmatic method prescribe a sort of "bootstrapping operation" but also offer an objective for its use: "as we remain disposed to self-criticism and to further inquiry, we have in this disposition an assurance that if the truth of any question can ever be got at, we shall eventually get at it" (MS 831 [1900]). Douglas Anderson explicates Peirce's analysis of this "pragmatic disposition," by which we can clarify our opinions to make them more effectively testable and comparable with the opinions of others:

> A hypothesis must explain the phenomena in question. An analysis of its logical purport, of its would-bes, allows an inquirer to determine this. Deduction then develops the implications of the would-bes, and induction tests for the reality of the generality that is the hypothesis or, more accurately, the object of the hypothesis, and thus "gives us the only approach to certainty concerning the real that we can have (*CP* 8.209)." (56)

Peirce's semiotic logic accommodates conceptual relativity, but not as a fundamental principle to assume; instead "man's reason is allied to the originating principle of the universe" (MS 425; *CP* 2.24 [1902]). Our ultimate concern is not just to establish consensus that would simply resolve diverse opinions, but to reach consensus about interpretations that could then continue to be tested and modified in further, concerted experience of the (always hypothetical) existential conditions. "There would not be any such thing as truth unless there were something which is as it is independently of how we may think it to be" (MS 881; *CP* 7.659 [1903]) (in Sheriff, 54); or, "The effect of pragmatism here is simply to open our minds to receiving any evidence, not to furnish evidence" (L 224; *CP* 8.259 [1904]); or, as Karl-Otto Apel says,

> Peirce identifies knowledge with hypothetical inference of things in the outer world. … knowledge consists neither of being affected by things in themselves nor of intuition of given data, but rather of the bringing about ("mediation") of a consistent opinion about the real; or, to be more precise, the "representation" of our outer states of affairs. (Apel, 21-22)

Peirce's new perspective evolved from his insistence that before we can ask the traditional philosophical question, "how is *knowledge* possible *from* experience," we must ask how *meaning* is possible *in* experience. What are the fundamental conditions for meaning to occur? This change in focus from knowledge to meaning (or from product to process) exposes two ancient philosophical issues: nominalism and objectivism. To the extent that we assume that we can capture meaning in representational structures (of any kind), we are nominalists (consciously or unconsciously). To the extent that we forget that each of us has only a limited (time and space) view of what possibly exists, through our individual experience (none of us has a "God's-eye view"), we are objectivists. Our natural human urge to generalize experience and use concepts to abstract the similarities and differences of particular episodes—or to form hypotheses—occurs so easily that we do not notice its happening. We might say it is *automated* for us by our sensory and cognitive processes, which make countless and minute inferences, upon which what we call *reasoning* depends as the basis for interpretation. In this automation, we gain reasoning power but lose awareness of that power's intricate assumptions in terms of causes and effects, or referential adequacy.

Peirce's response to the perils of nominalism is his pragmatism as a method of logic that encourages us to practice self-critical control in generalizing (or creating concepts from experienced episodes) by continually asking, *what would be the consequences in the conduct of our lives, if our concepts were true?* Peirce's pragmatism is a mode of conducting inquiry that avoids the puzzles of philosophical tradition and logical theory, which derive primarily from isolating knowledge from the procedures leading up to it (see Nagel). Pragmatism says: truth is what would be the result of indefinite inquiry. Consequently, our *way of proceeding*

must support the evolution of knowledge through any possible growth of meaning. Peirce's concern about nominalism can be crudely expressed as the individual's (apparently fundamental and natural) urge to believe that a particular representation gives a privileged view of what is experienced ("my map *is* the territory"), rendering further investigation of its accuracy and adequacy pointless and, thereby, "blocking the way of inquiry." The essential continuity of experience, giving it coherence and tendency, in which meaning is always a possibility in the future, is the fundamental theoretical hypothesis of Peirce's pragmatism—and that is ignored by the established American tradition that now goes by that name.

While nominalism leaves our individual views hopelessly relative, in terms of meaning, objectivism goes further and assumes that we all have (or can have) the same (and possibly complete) view, which simply "maps the facts of existence." Modern science has relied on this assumption, and the progress of technology of all kinds is testimony to its power as a belief. But the history of science and technology also demonstrates the hazard of objectivism: mistaking elaborate conceptual generalizations for what they are supposed to represent ("mistaking the maps for the territory") rather than using them as devices to be continually tested and modified as a basis for learning more.

Peirce's response to objectivism is his theory of inquiry (or semiotic), which establishes the fundamental relation of identity in logic as tri-relative, rather than the bi-relational identity of physical science for the objective study of action and reaction in terms of "facts." The meaning of a concept (as a logical relation) always depends on who is using it to refer to what; meaning is *virtual* not actual, *possibility* not fact. Knowledge, therefore, must be the provisional result of continuing hypothetical inference. When we treat meaning as factual (represented by a binary relation between symbol and referent, such as Saussure did in terms of *signifier* and *signified)*, we obscure the diversity of possible views that are necessary in continuing the growth of meaning. Because the conditions conceptualized in these theories are timeless (language coded to thought as accomplished fact), they cannot explain the uniqueness of someone's meaning in a particular time and place or how it can come to be understood by others. Any established symbol system tends to become algorithmic in its function and can "program" our experience, convincing us that we *know* only what we can *represent* with those symbols. Again, we "block the way of inquiry."

There may be no difference, in practice, between the effects of nominalism and objectivism. Both have unexamined metaphysical assumptions (concerning the relation of knowledge to existence, or the problem of explaining how we can effectively refer to—identify—something as the testable basis of our experience) that obscure the nature and significance of meaning in the growth of our experience, and prevent us from conceptually accounting for it. That is, to the extent that we believe that we, individually (nominalist) or

collectively (objectivist), have captured the truth in representational structures (of any kind), we are fooling ourselves that we have the only possible view of what truly *is*. Peirce's perspective does not remove these issues of traditional philosophy by exposing their errors but claims only that his method of pragmatism and his semiotic view of logic make them tractable. He does not draw the conclusion, as did Wittgenstein, that "the task of philosophy is to ward off the pragmatically empty language game" (see Potter 1996).

The difficulty is: each of us must believe something (make judgments), at least provisionally, in order to direct our conduct with respect to whatever exists—to make our actions more than simple physical reactions (to mediate our actions by means of inferences about what appears to be true). The urge to reach conclusions, to take our "maps" to *be* the truth, is a necessary part of effective "pragmatic" behavior; but, in Peirce's semiotically conceived pragmatism, we can, all along, maintain the provisional view of our condition by self-critically examining the actual and possible outcomes of our behavior, by as many means of representing those possibilities as we can create to do so (special skills of observation, multiple powers of expressing and comparing these observations, and elaborate technological augmentations of these skills and powers through new media).

The human predicament is that we must believe that we can capture meaning (in our expressions and thoughts) to some extent, or else we would never be able to reason at all—much less conduct ourselves on the basis of our thoughts, or express them to conduct ourselves jointly. Pragmatism invites us to accept this constraint and consciously build on it by *provisionally* believing that we have captured meaning in concepts and categories—while *continuing* to examine them critically, from as many points of view as possible. In logical terms: Peirce's philosophy establishes the fundamental logical relation—identity—as irreducibly (minimally) tri-relative (Burch, 139), making it *essentiall*y a semiotic relation (rather than the objectivist or nominalist bi-relative). Logic becomes semiotic, or a theory of communication, with all the pragmatic implications that entails.

Peirce followed medieval philosophers, in their development of the Greek theory of *semiosis* (shmeiwsiV), who conceived thought *as* communication (all thought is dialogic in form; see, for examples, MSS 634 and 637 [1909]) and investigated the necessary conditions for any form of such *mediation* to occur. A medium of expression does not simply "convey meaning" but becomes a part of our human experience to affect, in some way that cannot be completely predicted, those engaged in its use. In our modern technological conception of communication, we routinely consider the process as no more than the transmission of information, taking no comprehensive account of mediation—the conditions necessary for the occurrence of meaning in anyone's experience. According to Peirce, the *growth of ideas* cannot be fully accounted for in terms of information-transfer.

The essential nature and purpose—and virtue—of communication is *not* simply to transmit messages accurately (what information theory was conceived to predict), but to modify or add to them in the process (to generate new ideas about "the objects of our thoughts"—no matter how abstract, or general, these objects may be). In communication, we keep ideas growing and responding to our collective experience of the conditions that confront us —whether they are presented by natural phenomena or by our own creative expressions, which together constitute our experience, and whether or not they refer to anything of apparent pragmatic value. That consequence always remains to be discovered in the future.

Expressions have *virtual*, not factual, meaning—meaning that thought and communication continually generate in the process of mediation. In other words, expression involves more than the objective properties of representation (or the empirically observable features), because of the not-strictly-causal (only vaguely determinable) relation to what *someone's* thought *might* take those properties to mean. In semiotic terms, from any human point of view (which is necessarily limited), the meaning of any expression cannot be simply a matter of *probability* (or some established conventional response) but must include *possibility* (or an individual's unique experience in which the interpretation of meaning occurs) that cannot help but generate new meaning—growing experience. Only by means of a simplistic theory that construes a "sender" as omniscient and a "receiver" as robotic, could we ever attribute any effect (response of receiver) to a particular cause (intention of sender) through a medium of communication. A theory of "coded behavior" will never explain the creative productivity (that is, account for the potential diversity) that particularly characterizes human thought and communication.

> Two things here are all-important to assure oneself of and to remember. The first is that a person is not absolutely an individual. His thoughts are what he is "saying to himself," that is, is saying to that other self that is just coming into life in the flow of time. When one reasons, it is that critical self that one is trying to persuade . . . . The second thing to remember is that the man's circle of society (however widely or narrowly this phrase may be understood), is a sort of loosely compacted person, in some respects of higher rank than the person of an individual organism. (*CP* 5.421 [1905])

Being "semiotically aware" of representation, as a pragmatic procedure, means simply that we do not expect expressions (even definitions) ever to be complete and precise, since they are always relative to "*who* is referring to *what"* (the minimally triadic relation in which each component evolves, too, however slowly). Logic based on the triadic identity relation explains meaning in the world of Einstein's physical relativity (space-time dependent observations), where it remains hopelessly relative to those conditions (thus nominalist or

naively objectivist)—without our pragmatic conduct of comparing observations, *through time and space*, keeping identification always ultimately open to testing in future experience.

Peirce clearly states what he expects his new philosophical approach to accomplish:

> It is expected to bring to an end those prolonged disputes of philosophers which no observations of facts could settle, and yet in which each side claims to prove that the other side is wrong. Pragmatism maintains that in those cases the disputants must be at cross-purposes. They either attach different meanings to words, or else one side or the other (or both) uses a word without any definite meaning. What is wanted, therefore, is a method for ascertaining the real meaning of any concept, doctrine, proposition, word, or other sign. The object of a sign is one thing; its meaning is another. Its object is the thing or occasion, however indefinite, to which it is to be applied. Its meaning is the idea which it attaches to that object, whether by way of mere supposition, or as a command, or as an assertion. (MS 323; *CP* 5.6 [1906])

Pragmatism tells us how the conditions of experience, as semiotically examined, *effect* learning. Semiotic explains the need for pragmatism (a self-critical procedure for learning) and offers a theoretical means to identify and examine what are the necessary conditions for meaning to occur in experience. Pragmatism describes the practice or procedure for creating those conditions: "Nobody will expect of theory that it should furnish skill, or render practice needless" (MS 428; *CP* 2.201 [1902]).

The Semiotic View

Considering what I have attempted to explain of Peirce's philosophy, we might heed Leroy Searle's warning: "Perhaps the greatest difficulty, aside from the probability that all of us are born and bred nominalists, is that most will bring to Peirce's writing assumptions about 'logic,' 'metaphysics,' and 'semiotics' or about the idea of the 'sign' that may be fundamentally incompatible with the position Peirce elaborates" (559). We must more carefully consider Peirce's use of terms, in order to appreciate how he brings "iconic" into its crucial theoretical role. Peirce insisted that we must be able to examine the validity and reliability of any metaphysical assumptions (or how we relate to existence through experience) in logical terms (and those logical terms must be "up to the task," as well). We must be able to analyze this realm, even if we cannot know anything about it for certain (that is, our thoughts about it will always be unclear, without definitions).

As explained above, Peirce's semiotic (often referred to as a "sign theory") conceives experience (of any kind) in terms of mediation: a fundamentally *tri-relative* conceptual structure (object-sign-subjective idea) needed to account for its relational nature, which cannot be accounted for in dyadic conceptions or bi-relational terms (such as mind/body, sense/reference, signifier/signified). Although experience cannot be conceived in less than

the two terms of subject and object, more than these two concepts are needed because the theory must account for the *relationship* between the two separate terms when we speak of a subject *experiencing* an object. The necessary third term (focusing attention on the *relation* of experience between subject and object as a phenomenal element in its own right to define, analyze, and explain) makes the tri-relative theoretical structure minimally adequate. Peirce's relational logic prescribes an essential ordering (time-and-space context dimension) of these theoretical terms, as a construct to account for the generative aspect of experience. Without a tri-relational theoretical account of experience, scientific views of humanity have generally ignored creative thought and communication (or the generation of new meaning), which must be considered irrelevant and even impossible: if we have no conceptual comprehension of this creation, we are unable to examine it or explain how it occurs.

The deliberately constructed *tri-relative* terms explicitly take account of the relative nature of subjective meaning (or validity of individual points of view) and also of the *grounds* for its possible *objective stability* (or reliability in what must be the existential conditions of experiential reference), even though these conditions remain hypothetical from our limited human view. Anything that serves as a *sign* must do so for *someone*, in respect to *something*; no thing is simply (in fact) a sign; its sign potential is realized only through its being used to refer to something by someone (in specific instances). John Sheriff reminds us that "'[p]otential,' in Peirce's usage, means '*indeterminate yet capable of determination in any special case'* (*CP* 6.185-86)" (MS 948 [1897–98]) (4).

Signs, as semiotically defined, give us the conceptual means to analyze the conditions of *mediating* experience (whether we label it "thought" or "communication"). Signs, as mediation (*in experience),* cannot be examined simply as objects (*of experience),* by means of the empirical approach, but must also be conceived in terms of *semiosis* (as continuous phenomena). We must speak of "signs" as though they were entities, because language, our conventional medium of inquiry, is designed to treat *objects* of inquiry. (Consequently, says Bertrand Russell, we know much more about physics than about anything else [265].) Because of this limitation of language, when we use the word "sign" as a theoretical concept in semiotic, we must remain concurrently aware that we have abstracted the ongoing occurrence of semiosis (which Peirce calls "hypostatic abstraction"). Symbolic expressions (as empirical phenomena: marks on paper, for example) are the periodic products of semiosis, but their empirically identifiable features (structures) alone do not determine what meaning will be made of them as signs (in semiosis). We must remember, says Peirce, "In the first place, a sign is not a real thing. It is of such a nature to exist in replicas. Look down a printed page, and every 'the' you see is the same word, every 'e' the same letter. A real thing does not so exist in replica. The being of a sign is merely 'being represented'" (MS 517 [1904]).

No thing is *actually* a sign (not a diagram or image or even a string of text), in semiotic terms, but *any* thing is *potentially* a sign; what makes some *thing* function as a sign (in semiosis) is someone *using* it to refer to something else. Certainly, marks in alphabetic shapes forming words and sentences on paper are *more likely* to be used (by someone who is literate in that language) in mediation, because they have become conventional media—they have become habitual or automated in their function *(for that someone)*. In terms of Peirce's semiotic logic, we may speak of the sign, which is a relation, as a thing *only* in order to use the term in *analysis* of sign functions, or *sign-potential* (the potential of *something* to be used by *someone* to refer to *something else*). Most students of Peirce's theory misunderstand the role of the sign concept and conceive of signs as things, thereby reifying the concept (and perpetuating metaphysical confusion). We can continue to refer to signs in this convenient linguistic way, while we remember that we are referring only to the potential for meaning to grow (semiosis).

Perhaps the most well known set of tri-relational concepts in Peirce's theory is designed to investigate the referential (objective) potential for meaning to occur: to what extent is the sign (that is, anything we might expect to serve in semiosis for someone) capable of referring to its object? This relation may be one of resemblance (iconic), such as between a portrait and its subject; it may be one of indication or interaction (indexical), such as between smoke and fire; or it may be a relation by habit, rule, or convention (symbolic), such as between a word and what someone refers to by means of it. (Note that the 'object' in the sign relation need not be a *material* object, only a *phenomenal* object.)

The tri-relative form of these theoretical terms is designed to indicate that a sign relation by convention (symbolic) presupposes a relation by indication (indexical), which in turn presupposes a relation by resemblance (iconic). In more familiar terms (although less analytically useful), recognition must precede interpretation, when someone uses something as a sign to refer to something else. With Peirce's tri-relative terms to investigate the objective potential for meaning, we can imagine finding the potential for resemblance without anything in particular being indicative about the object (e.g., we can be fooled by specular reflection); and we could find the potential for resemblance and indication without any potential for implicating any sort of habitual response (we instinctively react at the clap of thunder).

These *pre-symbolic conditions of meaning* are the "grounds" for any effective symbolic meaning to occur. We can use the concepts of *iconic* and *indexical* to examine the sign potential of any medium to make effective reference, but we must remember that its symbolic potential is not simply determined by these pre-symbolic grounds but must be created by the habitual or conventional response that occurs in someone's interpreting. No one can say *as a*

matter of fact that something is a sign of something else for you, or me, or anyone else. *Sign* is the tri-relative concept of *potential representation* and, as such, theoretically reminds us that meaning *is always growing*.

According to this semiotic analysis of the potential for meaning in objective reference, the iconic potential of anything to serve as a sign is based only on its form. A map has iconic potential in relation to a territory by means of the lines exhibiting the form of the territory's structural features. As a pure analog of form, there is no distinction between the map and the territory. Of course, someone must be using the map as a sign for a mistake in identity to occur. In fact, until this pragmatic test of using the map to refer to the territory is conducted, the map is not actually a sign of anything (the territory may not exist). "[The iconic form] affords no assurance that there is any such thing in nature. But it is of the utmost value for enabling its interpreter to study what would be the character of such an object in case any such did exist" (MS 492; *CP* 4.447 [1903]). But even if the territory is purely imaginary, the map will have iconic sign potential in its form (quality or character) as *possibly* resembling a territory *for someone*. A full sign relation cannot occur by means of the iconic function alone, because it would not lead anyone to interpret: for "a sign is something by knowing which we know something more" (*SS* 31-32). And yet, the value of the iconic potential consists in "exhibiting the features of a state of things regarded as if it were purely imaginary" (MS 492; *CP* 4.448 [1903]). The iconic potential theoretically accounts for abduction (hypothesis), or what we experience *as possible*.

The indexical sign potential can be used to generate the sign-object relation by directing attention. It relies on the correspondence of form (the iconic potential) and works to isolate, rather than simply to exhibit, corresponding features between what might be used as a sign and its object. Color, for example, might direct someone's attention to a particular form (quality or character) on a map that indicates where this feature can be located in the territory. The indexical potential has the capacity to bring someone into actual connection with an object, presupposing resemblance (by means of the iconic function). Whereas the iconic potential cannot be used even to distinguish between what is potentially a sign and what is the object, the indexical potential can at least indicate that there is something other than what is potentially only the sign itself. If a certain object did not exist, what is potentially a sign could not indicate that there is something other than itself, and draw attention to differences among features of its form. What is potentially a sign would not have particular indexical features if a certain object did not exist, but it would continue to have those features whether or not it is interpreted (that is, enters into semiosis). If the color on a map directs someone's attention to the existence of something located in the territory, it provides some indication that

the territory exists. The indexical potential theoretically accounts for induction, or what we experience *as actual*.

If the color on a map's form is regularly used to relate to a key on the map that describes or names the feature to be found at a particular location, then the map has "grounds" for symbolic potential. The potential of resemblance and indication to generate symbolic relations between sign and object *for someone* requires the habitual connection of "formal" and "factual" (iconic and indexical) qualities and features (including forms of letters, punctuation, spacing, and other recurring objective features) in some symbolic system (medium). The symbolic potential works to generalize, abstract, categorize, select, combine, and code what the *pre-symbolic* functions present in terms of sign potential. In creating symbols (and reproducing them), we create *virtual* objects as the expressed products of semiosis that can seem more real to someone who uses them than does the territory itself (as when someone, by habitual routine, forgets that "the map is not the territory"). The symbolic potential of signs theoretically accounts for deduction, which makes it possible for us to formulate concepts (based upon what we experience as possible and actual) such as truth, rule, law, value, and generalities of any kind—or what we experience as *probable*.

Semiosis (the growth of meaning) relies on the pre-symbolic potential (iconic and indexical) for new reference material (evidence). These "grounds for meaning" are independent of any habit or convention. As Fitzgerald says, "The foundation for the sign is something that is used, but not made, by the interpreter" (46). Pre-symbolic properties will not actually function in sign-relations unless someone notices and employs them as such; but their relations of 'similarity to' and 'indication of' particular objects remain whether someone uses them or not. The symbolic function, on the other hand, makes no further correlation with the iconic and indexical potential of any specific object, but relates the employed iconic forms and indexical features presented in the medium of expression to other instances of similarity and difference, as abstractions, solely by virtue of the habits or conventions of an interpreter. Peirce says that all three functions (in coordination) are essential to any complete and serviceable language. For example, letters of an alphabet (in their many fonts) are iconic to one another for us, otherwise we would not recognize them; and any discrepancy among their forms makes us notice and perhaps investigate their iconic quality (as in the study of handwritten manuscripts).

According to Peirce, what makes a good system of diagrams iconic is that the parts of the diagrams are related to each other in the same way that the objects represented by those parts are themselves related to each other (see MS 527, *CP* 3.363 [1885]; 3.418 [1892]; 3.556 [1898]; and 3.641 [1902]). "[A] great distinguishing property of the icon is that by the direct observation of it other truths concerning its object can be discovered than those which suffice

to determine its construction" (MS 787, *CP* 2.279 [1893]; cf. MS 650 [1910]; and Roberts, 124). For this purpose, Peirce's Existential Graphs were crucial in demonstrating how his work in logic applies to his work in philosophy. He thought, for instance, that they would provide a "less mechanical and fatiguing" introduction to the logic of relatives, an introduction which would "better display its living ideas and connections with philosophy and with life" (MS 436 [1898]; see also Roberts, 127). Certainly, any mathematician or logician would agree that "[b]y relieving the brain of all unnecessary work, a good notation sets us free to concentrate on more advanced problems, and in effect increases the mental power of the race" (Whitehead, 1948: 39).

In fact, linguistic structure (as words in sequence) does not efficiently express the leading nature of propositions, which make intricate connections. In terms of mediational efficiency, the linguistic mode of expression puts a cognitive burden on us to track the progress of related ideas, constantly trying to follow the rules of its structure and conventions of its use—as a symbol system. Peirce's comprehensive theory exposes difficulties that result from basing logic (or any explanation of reasoning) on the symbolic character of language, which fundamentally prevents us from examining the essential continuity of experience in the growth of meaning. He argues that graphical notation, such as the Existential Graphs, serves as a more effective instrument for investigating the formal relations of linguistic symbols, diagrammatically, "since no reasoning that amounts to much can be conducted with[out] *Icons* and *Indices*" (*SS* 118), to make their logical (relational) character *observable*. At the same time, he cautions that no mode of reference performs complete representation:

> The system of Existential Graphs may be characterized with great truth as presenting before our eyes a moving picture of thought. Provided this characterization be taken not as a flatly literal statement, but as a simile, it will, I venture to predict, surprise you to find what a strain of detailed comparison it will bear without snapping. A picture is visual representation of the relations between the parts of its object; a vivid and highly informative representation, rewarding somewhat close examination. Yet from the nature of things it must fall short of perfection, just as a representation of any kind must. It cannot directly exhibit all the dimensions of its object, be this physical or psychic. It shows this object only under a certain light, and from a single point of view. (MS 291 [1905])

The semiotic qualities of diagrams allow us to keep track of logical relations (and their evolution) more efficiently than does linguistic structure, which even obscures relations in "symbolic transparency." Peirce gives the following imaginative dialogic argument for his use of graphical notation.

> Come on, my Reader, and let us construct a diagram to illustrate the general course of thought; I mean a System of diagrammatization by means of which any course of thought can be represented with exactitude.
>
> "But why do that, when the thought itself is present to us?" Such, substantially, has been the interrogative objection raised by more than one or two superior intelligences, among whom I single out an eminent and glorious General.
>
> Recluse that I am, I was not ready with the counter-question, which should have run, "General, you make use of maps during a campaign, I believe. But why should you do so when the country they represent is right there?" . . . "Am I right, then, in understanding that, if you were thoroughly and perfectly familiar with the country, as, for example, if it lay just about the scenes of your childhood, no map of it would then be of the smallest use to you in laying out your detailed plans?" To that he could only have rejoined, "No, I do not say that, since I might probably desire the maps to stick pins into, so as to mark each anticipated day's change in the situations of the two armies." To that again, my sur-joinder should have been, "Well, General, that precisely corresponds to the advantages of a diagram of the course of a discussion. Indeed, just there, where you have so clearly pointed it out, lies the advantage of diagrams in general. Namely, if I may try to state the matter after you, one can make exact experiments upon uniform diagrams; and when one does so, one must keep a bright lookout for unintended and unexpected changes thereby brought about in the relations of different significant parts of the diagram to one another. Such operations upon diagrams, whether external or imaginary, take the place of the experiments upon real things that one performs in chemical and physical research. Chemists have ere now, I need not say, described experimentation as the putting of questions to Nature. Just so, experiments upon diagrams are questions put to the Nature of the relations concerned." (*CP* 4.530 [1906])

The semiotic view tells us that nothing you or I can say will ever be true, but the more we can (all) effectively express our individual views and reconcile differences among them, the closer we will come to the truth, and pragmatism says that the *meaning* of a concept is all the *possible causes and effects* to which that concept refers. The semiotic describes the conditions of representation that confront us: none of us will ever have "the map that can fully capture the territory of our experience" (which, in any case, continues to grow as we are constructing "maps") and each of us can have only mortal (time-and-space-limited) experience (views) of whatever exists as "the territory." But pragmatism implies that the more we can effectively "construct the maps based on many individuals' experiences," and test their reliability through continued investigation (which, through communication, extends individual experience indefinitely) the closer we can hope to come in reflecting what really is the territory (what might really exist, or be true).

We must suppose that this semiotic process will continue indefinitely, because no one has the God's-eye view to say when the ideal of absolute congruence might be reached—and, if we are part of "the creative evolution of the territory," as Peirce's metaphysics insists, it will

remain beyond our reach since interpreting it is contributing to its creation. Semiotic says: Our representations can never establish complete truth, but only indicate what is possible evidence to test in further experience. Pragmatism says: Truth is what would be the result of indefinite inquiry.

While the semiotic view explains how conceptual experience grows, based on the generalizing tendency that works to maintain the relatedness or continuity of ideas, pragmatism can be appreciated as the methodological reminder that generalizing is not an end in itself (as nominalism assumes). Our unifying cognitive urge, in turn, must serve our discriminating sensory capability, through our conduct in a continuing cycle of conceiving and testing ideas against reality. In this continuous (reasoning) effort (formulating coherent ideas, testing them against sensory experience, modifying them in response, and testing them again) we rely, in semiotic terms, on mediation relations so minute and complex in the subtleties of linguistic expression, alone, that we could never be aware of or account for them all. In fact, if most mediation relations did not occur for us automatically, without our conscious thought, we could not operate successfully. To the extent that we can establish trustworthy relations (concepts), as a result of experience, we can establish habits of thought and behavior (by training and learning)—which function uncritically unless disturbed by new experience in which they are recognized as dysfunctional.

Relying on such complex mediation, we establish (more or less successful) mediated relations with the world around us. To the extent that we make these relations habitual, we tend not to notice them and examine their effectiveness. We learn languages without examining their "fitness" in representing our experience. We establish habitual relations with the world through tools and technological devices of all kinds that release us from routines, which then become the automated basis for building new pursuits. The human-computer relation may epitomize our capability to establish habitual relations and increasingly build them into automated mechanisms, once we can define a habit in terms of an algorithm (or routine of interpretation for executing some operation). In human-computer interface design, we have begun to realize the need to analyze the automated (or unnoticed, transparent) operation in relational detail, to create better human-computer communication. [ref to Keeler/ Denning] Peirce's Existential Graphs have been further developed for this "knowledge representation" purpose. [See Sowa 1984.]

Peirce considered his metaphysics to be "the science of unclear thinking," for which his semiotic would serve to analyze the evolution of meaning from its most vague hypothetical (iconic) potential to its most precise deductive (symbolic) power. The fundamental difficulty for traditional logic (as a means of representing thought) is the metaphysical circumstance that symbols exist in replica (which gives us precision for abstract inferential power), whereas the

world of what we call "objects" does not exist in replica (no matter how much we would like to ignore this condition for our symbol-using referential convenience). His work to develop semiotic as the logic of metaphysics (or "the logic of vagueness") convinced him that *objective idealism* (our necessary logical assumption that there is a valid basis for common meaning between individuals and even across cultures), in order to be effective, must be complemented by *logical realism* (the metaphysical assumption that our ideas to tend toward reliable reference in the world of our experience).

Human Creativity

Peirce's semiotic, as a theory of inquiry, begins with the hypothesis that the most general aspect of experience is relatedness or relativity. Experience is a continual synthesis (semiosis). The iconic (similarity) and the indexical (contiguity) always influence this synthesis to some extent, more or less consciously, depending on "our semiotic awareness" (how able we are to examine the formal qualities and contextual features of the medium we employ for a particular communication purpose). Iconic and indexical potential—corresponding to the traditional terms of "connoted depth" (intrinsic meaning) and "denoted breadth" (extrinsic meaning)—make it possible for the sign to "stand in place of" and "stand for" the object to which it refers. Letters on parts of a diagram clearly have this prominent potential, but require the interpreter's habits or conventions to be employed as forms of expression and in contexts of reference (see MS 1461; *CP* 8.119 [1902]).

The indexical potential exploits the factual relations between sign and object, and the iconic potential exploits what might be the shared characters (any possible correspondence) of the sign and object. These pre-symbolic conditions of a medium can provide more or less potential for new symbolic meaning to occur, depending on the medium's iconic and indexical capacity of display; and depending on the habits, rules, and conventions of the interpreter, which work to limit the presymbolic potential in terms of what the interpreter finds familiar and indicative in any particular interpretational circumstance.

For example, words have the power of standing for, and indicating, particular objects only in virtue of the interpreter's habit of using the language containing those words. Without this power, the words are just sounds or marks, which may even be familiar (iconic) or indicative (indexical) without being symbolic for someone (who may recognize the language but not know its conventions of interpretation). What might be a symbol (which is first of all a created object) cannot—without the symbolic potential (through someone's experience) to be related to an object—exhibit or indicate anything but its own perceivable qualities (e.g., font style, tone of voice, or color of lines). At the point of interpretation, the perceivable

properties of the medium that constitute the iconic and indexical potential effectively *disappear* for that someone (which is why we all need good editors). This "transparency" is required for symbolic representation to be effective (for the sign to be used efficiently by someone to refer to something other than itself). [ref to Keeler's "Transparency"?]

Peirce's account of the iconic and indexical potential of anything to function as a sign helps us conceive what are the "grounds" for a medium's effective transparency in semiosis. The iconic (form) "does not draw any distinction between itself and its potential object"; the indexical (context) "directs attention to something other than itself." Since the symbolic potential occurs only through the interpreter's conduct (with all its possible variations in habits, rules, and conventions), the form and context embodied in the medium (such as the uniformity of printed text) make it possible to establish regularity and stability (through familiar and indicative forms and features of the medium) as a new reference basis for inventing new concepts and categories, which give an interpreter the opportunity to recognize new similarities and differences not noticed before. As symbolic reference becomes more automated by a medium in an interpreter's conduct of inquiry, the iconic and indexical potential for interpretation is greatly determined by the representations that medium can make available for interpretation. Once we create symbols (such as linguistic descriptions in printed texts) to refer to objects (such as the pages of an author's manuscript), we can create symbols to refer to those symbols (as virtual objects), indefinitely, all with effectively transparent (unnoticed) iconic and indexical potential for those who habitually use them. From this semiotic view, we can study how the mediational forms we create (from cave paintings to language to clay tablets to printed books to television to digital multimedia) can enhance *or* inhibit our experience (or ability to inquire or learn).

Viewed semiotically, our ability to use symbolic expressions is the boon of human intellect—but often also the bane of our existence to the extent that we uncritically assume their inferential validity and referential reliability (conceived as iconic, indexical, and symbolic potential) through symbolic transparency. The powerful and transparent operations of our mediating symbol systems give us the capability to replicate symbols, without being aware of how a particular medium has determined (or limited) their iconic and indexical potential. What we approve as knowledge tends to conform to what we have been able to express in such conventional systems, and we cannot use a particular system to examine its own limitations.

Peirce's pragmatism responds to this human predicament by insisting that the traditional view of logical necessity (or validity) does not establish conceptual truth, but only possibilities to test for their referential usefulness (or reliability) in future experience. And apparent conceptual reliability (as knowledge) does not establish fact, except provisionally, to

be represented and tested in further experience. We can know to the extent that we can learn to represent what we each observe, effectively (to ourselves and to others), as interpretations whose intricate inferences can always be examined for their iconic coherence (or formal validity) and indexical accuracy (or factual reliability), so that we might continue to reconcile (or learn something new from) many observations through time, by the most effective (and efficient) media we can develop for that communication purpose.

While individual points-of-view (whether of someone comparing and relating experiences moment-to-moment or of a group in communication) are accounted for in terms of Peirce's semiotic tri-relation, this logical structure can also clarify what constitutes the *potential* advantage of a conventional medium of communication, such as language: "It appears to me that the essential function of a sign is to render inefficient relations efficient,—not to set them into action, but to establish a habit or general rule whereby they will act on occasion. . . . [And] a sign is something by knowing which we know something more" (*SS* 31-32).

The simple essence of both pragmatism and semiotic are expressed in this statement, and both are crucial to understanding what Peirce means by "efficient relations." Just as mediation in a language (when conventionally used by all participants) allows us to treat the medium transparently in order to express ideas, its very transparency can prevent us from examining the generalizing character of that medium's established structure and habituated function. Taking the sign (mediating relation between subject and object) as an analytical focus, we can imagine that a response to the sign may be perfectly automatic but, if the sign's relation to its object is not well-established (based on the sign-user's experience of that object), then the tri-relation as a whole will not be efficient (efficiency entails effectiveness) in its role of referring to *something* for someone. As the units of language (words, sentences, paragraphs, documents, etc.) grow, their combinatorial power increases, while their referential power decreases (symbols can take on a life of their own). Symbolic power can easily mislead us, as any rhetorician knows.

Pragmatic procedure, as Peirce conceives it, can help us create truly efficient sign relations by maintaining the unifying function of conventionality while encouraging the diversifying function of representability through any media that can be devised for that purpose. We can examine our habits and consciously develop new ones, based upon what we can imagine to be possible as the consequence. The powerful transparent nature of our mediating symbol systems gives us this advantage—and its companion danger. The history of science demonstrates the hazards of nominalism and objectivism: mistaking elaborate conceptual generalizations for what they supposedly refer to, rather than using them as devices to be continually modified as more is learned. (See Nagel and Newman's discussion of the model method, 15-25.) Peirce makes clear that generality is a form of vagueness, that

an absolutely and completely determinate sign is an impossibility (see MS 300 [1908]). "No cognition and no Sign is absolutely precise, not even a Percept; and indefiniteness is of two kinds, indefiniteness as to what is the Object of the Sign, and indefiniteness as to its Interpretant [or interpreting idea]" (*CP* 4.543 [1906]). In the semiotic explanation of the tri-relative condition, a sign refers to something for someone: the sign can never *be* the thing referred to (it would have no use in generalizing) and we never know for sure what someone might take it to mean. "[P]erfect accuracy of thought is unattainable,—*theoretically unattainable*. And undue striving for it is worse than time wasted" (*SS* 11).

The efficiency of intelligent experience in establishing reliable habits (or conduct) depends on our capability to compare past results and postulate future outcomes (possible causes and effects), through communication (with oneself and others). Learning, or gaining knowledge intelligently, is more efficient than by simple trial-and-error—to the extent that we have the capability to represent and examine our experience (whether individual or collective) in terms of what we can discern to be the "state of things" with respect to our experience, *as it progresses*. Peirce created his Existential Graphs to make that observation as representationally efficient as possible, through their iconic potential for meaning. Jay Zeman carefully points out that the Graphs "are to be considered 'maps'; they are not pictures of facts—for who ever saw a fact that looked like an existential graph—but they are supposed to indicate continuity where there is continuity, and represent discontinuity where there is discontinuity" (24).

These Graphs are not the "simplest maps," as Peirce defines them: "A map of the simplest kind represents all the points of one surface by corresponding points of another surface in such a manner as to preserve the continuity unbroken, however great may be the distortion" (MS 467; *CP* 4.513 [1903]). As Zeman explains, points in a given Graph are intended to be correlated with what may loosely be called "features of the universe of discourse represented by the sheet of assertion upon which that graph is scribed," rather than with "points of another surface" (23-24). Peirce's Existential Graphs provide a (meta-linguistic) means of observing the semiotic growth of language, where the existence of anything referred to remains permanently hypothetical (never absolutely confirmed or denied); yet, "there is one assurance that the Icon does afford in the highest degree. Namely, that which is displayed before the mind's gaze—the Form of the Icon, which is also its object—must be *logically possible"* (*CP* 4.531 [1906]).

Comprehensively, Peirce's semiotic metaphysics tries to explain human creativity: how our feelings (instincts) become effectively related to what (without this mediation capability) would be the brute-force objects in a world of simple reaction, by means of our power to contemplate and converse, which makes it possible for us to "know" (to gain some control of

what happens in our experience). Self-critical, collective reasoning is the scientific method—though science is not a body of certified truths or systematized knowledge. Peirce even suggested that knowledge is not the point of science at all: knowledge though systematized may be dead memory (or hide-bound). "[O]ur knowledge is never absolute but always swims, as it were, in a continuum of uncertainty and of indeterminacy" (MS 955; *CP* 1.171 [1892]).

The scientific inquirer is a member of a community of those who disinterestedly pursue the truth, which none can know as a matter of fact and must be conceived as an ideal or limit. The pursuit advances, essentially, through dialogue and is successful to the extent that it can produce testable representations of what is observed or interpreted (see MS 881; *CP* 7.605 [1903]). "Knowing" is entirely a collective achievement, based on our ability to establish the validity and reliability of our representations collectively (see Hookway, 119). Only by our continued attempts to make whatever exists intelligible, through representation, can we understand it in some measure—that continues to grow. Ultimately, knowing is continuing to represent what we learn, through observation and expression, in our conduct—which is *our most efficient possible relation to existence*.

Written language (and especially replicable print) has encouraged us to assume that we can capture meaning in static, reproducible structures. We now have an electronic medium of expression with which we may hope to observe *the evolution of meaning*, and to realize that the structures we create are not *ends* but *means* for continuing the growth of experience. We no longer need to identify stability of meaning with the ideal of establishing absolute definitions that we imagine to be consistently and perfectly interpreted, but rather with *tendencies* in the growth of meaning. What is crucial in these new mediational circumstances is to build media that will *support* continuous conceptual growth. Peirce's theory does not encourage us to develop a conventional mode of analyzing media, such as linguistics and symbolic logic have given us for language and its expressions, as though they were existential conditions (or objective structures). Instead, he developed his semiotic, pragmatism, and Existential Graphs to *investigate and discover* how concepts (along with the media and modes we use to express them) evolve: an evolution that will continue, whether theoretical logic and science help us comprehend it or not (see Ransdell 1977).

In terms of his semiotic, Peirce considered what twentieth-century physicists and philosophers call the problem of indeterminacy to be the conditions of representational multiplicity, to which his pragmatism responds. Any particular expression or interpretation might well lead to a definite response, which then can be evaluated for its usefulness in that context; but no particular representation can possibly be the end of inquiry or claim to be absolute. Determining meaning, for any particular circumstance, and testing it in further

experience is the procedure for maintaining a potential indefinite determinability, in which every proposition (sign) would be part of an endless continuum that never reaches, but approaches the limit of, perfect representation. As Searle explains:

> While this [pragmatism] appears to leave meaning infinitely deferred, it would be more accurate to say that it accepts meaning (as it does thought and reality itself) as a continuous process, which we determine, with arbitrary precision (depending on "different circumstances and desires"), in communities of inquiry. Finally, Peirce's pragmaticism reflects [his] sense that thinking is normative and in its deepest reaches ethical and aesthetic; it must be these if it is to be scientific (*CP* 5.36, 8.242). According to the title phrase of one of his most widely read essays, it is by inquiry and experiment that we seek the "fixation of belief" (*CP* 5.358 ff.), while the ethics of the process is profoundly summarized in the slogan that Peirce would have on "every wall of the city of philosophy: Do not block the way of inquiry" (*CP* 1.135)—which is to say, no belief is ever ultimate, and no one ever gets the last word. (562)

The medium of the printed page and bound book has given us the authoritative text (the last word for the foreseeable future), and its rigid nature and the cost of production infuse the role of an editor with the notion of establishing at least textual intention as an artifact, almost as an end in itself. "In this hide-bound mode of existence, representation functions to stabilize (pragmatically) the procedure of scholarship but, at the same time, to abbreviate the critical process that is fundamental to the vitality of the collective scholarly mind" (see Keeler and Kloesel in *Margins of the Text*, 1996). As we invent the new digital medium, Peirce's semiotic perspective could help us appreciate the editorial role in the procedure of collective inquiry, where keeping track of the tendencies in the growth of meaning will be crucial to maintaining balance between *symbolic regularity* and *iconic spontaneity*. In the next century, we could hope to have inquiry that is not driven by its medium but finds unlimited possibilities for creative growth in such artifacts as the iconically and indexically rich pages of an author's manuscripts, displayed on high-quality monitors and explorable with the ever-growing relational power of computers. Digitally-based media may even give us the semiotic perspective (and representational facility) to appreciate the pre-symbolic virtues of all texts so that we can employ them more pragmatically, as indicated by Potter:

> Texts are not series of traces in which meaning and its comprehension are endlessly deferred, but rather enactments and embodiments of purposes in which those purposes are frustrated as well as fulfilled, concealed as well as revealed. They are not to be beaten into the idiosyncratic shape desired by any and every whimsical interpreter; rather, they are, in some measure, the stable and even stubborn expressions of evolved and evolving purposes. As such they have the force of invitations to participate in the further articulation of shared purposes (Potter, xvi).

Peirce constructed his semiotic view from the hypothesis that the creative act of mediation (or semiosis, a dynamic occurrence) requires three essential conditions: the medium of expression, the object of the expression, and the idea generated by someone who interprets what might be expressed in the medium about the object. Imagine that "someone" is Peirce himself, for example, generating ideas by means of his own expressions in a manuscript, considering the objects of his own thought. Or we may imagine someone else, such as a scholar, editor, or student attempting to interpret Peirce's manuscripts and what he might be trying to express. Peirce communicated with himself by means of the text and drawings in his manuscripts to record the growth of his conceptual depth and breadth, or to "snapshot" his ideas as they progressed to keep track of where they might be headed or where else they might go. Those who study Peirce's work communicate with him by means of those manuscripts, relating his ideas to their own experience in particular fields of inquiry so that meaning continues to grow. As the objects in semiotic progress, those pages hold the iconic potential to keep the way of inquiry unblocked.

Note

All "MS" and "L" references are to Peirce's manuscripts and letters. "CP" (with volume and paragraph numbers following) refers to the *Collected Papers*, "W" refers to *Writings of Charles Sanders Peirce*, and "SS" to *Semiotic and Significs*; all of which may be found in the References under "Peirce."

References

Anderson, Douglas R. *Strands of System*. West Lafayette, Indiana: Purdue University Press, 1995.

Apel, Karl-Otto. *Charles S. Peirce: From Pragmatism to Pragmaticism* (John Michael Krois, trans.). New Jersey: Humanities Press (paperback edition), 1995.

Burch, Robert W. *A Peircean Reduction Thesis*. Texas Tech University Press, 1991.

Buchler, Justus. *Charles Peirce's Empiricism*. New York: Harcourt, Brace, and Company, 1939.

Esposito, Joseph L. *Evolutionary Metaphysics: The Development of Peirce's Theory of Categories*. Athens: Ohio University Press, 1980.

_____. "On the Origins and Foundations of Peirce's Semiotic." In *Peirce Studies 1* (Lubbock, TX: Institute for Studies in Pragmaticism, 1979): 19-24.

Feibleman, James. *An Introduction to Peirce's Philosophy*. New York: Harper and Brothers, 1946.

Fetzer, James H. *Artificial Intelligence: Its Scope and Limits*. Boston: Kluwer, 1990.

Hardwick, Charles S. "Peirce's Influence on Some British Philosophers: A Guess at the Riddle." In *Peirce Studies 1* (Lubbock, TX: Institute for Studies in Pragmaticism, 1979), pp. 25-30.

Hookway, Christopher. *Peirce*. London: Routledge and Kegan Paul, 1985.

Jones, C.S. *Peirce on Intuition and Instinct*. Dissertation Oklahoma 1972. Ann Arbor, MI: University Microfilms, 1973.

Keeler, Mary A. and Christian Kloesel. "Communication, Semiotic Continuity, and the Margins of the Peircean Text." In David Greetham (ed.), *Margins of the Text*. Ann Arbor: University of Michigan Press, forthcoming in 1996.

_____. "Conceptual Structuring and Communication," in the *Proceedings of the International Conceptual Structures Conference*, Sydney, Australia, 1996: pp. ???

_____."The Philosophical Context of Peirce's Existential Graphs," in the *Proceedings of the International Conceptual Structures Conference*, University of California, Santa Cruz, 1995: pp. 150-165.

_____. and Susan Denning. "The Challenge of Interface Design for Communication Theory: from Interaction Metaphor to Contexts of Discovery." *Interacting with Computers* 3:3 (December 1991): 283-301.

_____. "Investigating Transparency in the Conditions of Mediation." *Semiotica* 82:1-2 (1990):15-41.

Lowe, Victor. "Peirce and Whitehead as Metaphysicians." In E.C. Moore and R.S. Robin (eds.), *Studies in the Philosophy of Charles Sanders Peirce: Second Series*. (Amherst: University of Massachusetts Press, 1964): 430-54.

MacKay, D.M. "Formal Analysis of Communicative Processes." In R.A. Hinde, ed., *Non-Verbal Communication*. (Cambridge: Cambridge University Press, 1972).

Moore, Edward C., and Richard S. Robin (eds.). *Studies in the Philosophy of Charles Sanders Peirce: Second Series*. Amherst: University of Massachusetts Press, 1964.

Murphey, Murray G. *The Development of Peirce's Philosophy*. Cambridge: Harvard University Press, 1961.

Nagel, Ernest, and James R. Newman. *Gödel's Proof*. New York: New York University Press, 1958.

Peirce, Charles S. *Collected Papers of Charles Sanders Peirce*. Eight volumes. Edited by Arthur W. Burks, Charles Hartshorne, and Paul Weiss. Cambridge: Harvard University Press, 1931-58.

_____. *The New Elements of Mathematics by Charles S. Peirce*. Four volumes. Edited by C. Eisele. The Hague: Mouton, 1976.

_____. *Semiotic and Significs: The Correspondence between Charles S. Peirce and Victoria Lady Welby*. Edited by Charles S. Hardwick. Bloomington: Indiana University Press, 1977.

_____. *Writings of Charles S. Peirce: A Chronological Edition*. Five volumes. Edited by Christian J.W. Kloesel et al. Bloomington: Indiana University Press, 1982-93.

_____. *The Essential Peirce* (Volume 1, 1867-1893). Edited by Nathan Houser and Christian J.W. Kloesel. Bloomington: Indiana University Press, 1992.

Potter, Vincent G. *Peirce's Philosophical Perspectives*. New York: Fordham University Press, 1996.

_____. *Charles S. Peirce: On Norms and Ideals*. Amherst: University of Massachusetts Press, 1967.

Prigogine, Ilya. *Order out of Chaos: Man's New Dialog with Nature*. New York: Bantum Press, 1984.

Putnam, Hilary. *Realism and Reason: Philosophical Papers, Vol. 3*. Cambridge: Cambridge University Press, 1983.
_____. *Renewing Philosophy*. Cambridge, MA: Harvard University Press, 1994.
_____. *Reason, Truth, and History*. Cambridge, MA: Cambridge: Cambridge University Press, 1981.
Quine, W.V.O. "Two Dogmas of Empiricism." In his *From a Logical Point of View* (Cambridge: Harvard University Press, 1953): 20-46.
Ransdell, Joseph M. "Semiotics and Linguistics." In Irmengard Rauch and Gerald F. Carr (eds.), *The Signifying Animal: The Grammar of Language and Experience* (Bloomington: Indiana University Press, 1980): 135-85.
_____. "The Epistemic Function of Iconicity in Perception." *Peirce Studies 1* (Lubbock TX: Institute for Studies in Pragmaticism, 1979): 51-66.
_____. "Some Leading ideas of Peirce's Semiotic." *Semiotica* 19 (3/4), 157-78, 1977.
Roberts, Don D. *The Existential Graphs of Charles S. Peirce*. The Hague: Mouton, 1973.
Robin, Richard S. *Annotated Catalogue of the Papers of Charles S. Peirce*. Amherst: University of Massachusetts Press, 1967.
Russell, Bertrand. *Philosophy*. New York: W.W. Norton, 1927.
Santillana, George de, and Edgar Zilsel. *The Development of Rationalism and Empiricism*. Chicago: University of Chicago Press, 1941.
Saussure, Ferdinand de. "The Linguistic Sign." In Robert Innis (ed.), *Semiotics: An Introductory Anthology* (Bloomington: Indiana University Press, 1985): 24-46.
Searle, John. "The Philosophy of Language," in Bryan Magee, ed., *Men of Ideas*. New York: Oxford University Press, 1978: 153-72.
Searle, Leroy R. "Peirce, Charles Sanders." In Michael Groden and Martin Kreiswirth (eds.), *The Johns Hopkins Guide to Literary Theory and Criticism* (Baltimore and London: Johns Hopkins University Press, 1994): 558-62.
Sheriff, John K. *Charles Peirce's Guess at the Riddle: Grounds for Human Significance*. Bloomington: Indiana University Press, 1994.
Sowa, John F. *Conceptual Structures: Information Processing in Mind and Machine*. Reading, MA: Addison Wesley, 1984.
Thompson, Manley H. *The Pragmatic Philosophy of C.S. Peirce*. Chicago: University of Chicago Press, 1953.
Whitehead, Alfred North. *An Introduction to Mathematics*, revised edition. London: Oxfored University Press, 1948.
Zeman, J. Jay. *The Graphical Logic of C.S. Peirce*. Dissertation Chicago 1964.

5.497 (Pragmatism and Critical Common-Sensism)
FN
I write in the form of a dialogue because it is in that form that my thoughts come to me; and I call my critic Jules [in this particular dialogue] in the endeavour to give his objections the solidity equal to those of a subtle Italian opponent of Pragmatism who writes under the *nom de guerre* of Giuliano il Sofista [Giuseppe Prezzolini].

Published in *The Iconic Page in Manuscript, Print, and Digital Culture, University of Michigan Press,* 1998.