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Das Bild zwischen Kognition und Kreativität

Interdisziplinäre Zugänge zum bildhaften Denken



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SEMEIOTIC

KENNETH LAINE KETNER

It is my fate to be supposed an extreme partisan of formal logic, and so I began. But the study of the logic of relations has converted me from that error. Formal logic centers its whole attention on the least important part of reasoning, a part so mechanical that it may be performed by a machine, and fancies that is all there is in the mental process. For my part, I hold that reasoning is the observation of relations, mainly by means of diagrams and the like. It is a living process. This is the point of view from which I am conducting my instruction in the art of reasoning. I find out and correct all the pupil's bad habits in thinking: I teach him that reasoning is not done by the unaided brain, but needs the cooperation of the eyes and hands. Reasoning, as I make him see, is a kind of experimentation, in which, instead of relying upon the intelligible laws of outward nature to bring out the result, we depend upon the equally hidden laws of inward association. I initiate him into the art of this experimentation. I familiarize him with the use of all kinds of diagrams and devices for aiding the imagination."

C. S. Peirce¹

¹ Letter from Peirce to J.M. Hantz, 29 March 1887 (see Ketner 1988a:45). This letter was written roughly ten years before Peirce developed Existential Graphs out of the earlier and broader hypothesis of diagrammatic thought. Note that another feature of diagrammatic thought is the claim that we actually observe relations. This doctrine is another early feature, as shown in an important review of Abbot's *Organic Scientific Philosophy: Scientific Theism* in *The Nation*, 42 (11 February 1886) 135-136; the review is republished in Ketner and Cook (1975: 73). The doctrine [of Abbot's book] seems to be that the relations are reproduced, without being embodied in any diagram, as 'concepts of relations, dropping out of consideration the things related.' The knowledge of

Semiotic is an extensive research project by Charles Peirce, conducted over a number of decades (roughly 1865 through about 1910), the aim of which was to provide an understanding of the logic of scientific method. As such, it can provide an insight into the methodological commonalities found in all science: physical, cultural, biological. Existential Graphs (EG) constitute the *lingua franca* for mature Semiotic/Logic. The ontology required for EG is the same required for his Theory of Signs (or Semiotic), namely: relations understood as the building blocks of reality, much in the manner of contemporary Quantum Physics.

The purpose of this essay is to offer a larger-scale overview of Peirce's *Semiotic*. I will not attempt to give a detailed justified exegesis of Peirce's approach, but will proceed to lay out the proposal on the assumption that my outline does indeed capture Peirce's Semiotic. Whether that is true is yet another hypothesis to be tested.

I use the term *Semiotic* (pronounced "See-my-OH-tick") to refer to, just as Peirce did, his theory of signs which is quite different from contemporary semiotics. Peirce's rather well-worked-out approach varies in prominent and significant ways from the mixed methods and variegated fundamentals found in contemporary semiotics. The assumption that semiotic is the same as semiotics is an equivocation fallacy to be avoided. The question of which approach will survive and prosper is a matter to be settled by scientific study and the flow of civilization. My concern is to maintain clarity for the sake of the ethics² of science—to insure

relations depends upon a special 'perceptive use of the understanding.' This view, although it is not adequately set forth, is the centre of all that is original in the book, and is sure to excite a fruitful discussion of the question of the mode of our discernment of relations. Of all the sciences - at least of those whose reality no one disputes - mathematics is the one which deals with relations in the abstractest form, and it never deals with them except as embodied in a diagram or construction, geometrical or algebraical. The mathematical study of a construction consists in experimenting with it; after a number of such experiments, their separate results suddenly become united in one rule, and our immediate consciousness of this rule is our discernment of the relation. It is a strong secondary sensation, like the sense of beauty. To call it a perception may perhaps be understood as implying that to discern each special relation requires a special faculty, or determination of our nature. But it should not be overlooked that we come to it by a process analogous to induction.

2 See "Peirce's Ethic of Terminology," Ketner 1981. See also Max Fisch's definitive essay, "Peirce's General Theory of Signs," in Fisch 1986.

that it is clear that the hypotheses advanced here arise from semeiotic, not from semiotics. Is this terminological distinction a personal foible? It may or may not be, but that is irrelevant: both foibled or nonfoibled persons may utter a sound argument, the soundness of which is quite independent of foiblicity factors. Semeiotic as a distinct proposal is a legitimate scientific hypothesis which should be settled by science, not by any of the other three methods Peirce reviewed in "The Fixation of Belief".³

This essay lies within an abductive (hypothesis-seeking) stage of inquiry. All scientific intelligences will recognize that the next step might be described as the process of torturing the hypotheses to discover what might stand under rigorous examination. I do want to avoid the surprisingly common Abductive Fallacy of *Falling in Love with one's Hypothesis*. And scientific Intelligences will also recognize that the hypotheses advanced by the essayist are not to be confused with the essayist. In other words, please help me torture these hypotheses, but don't torture me.

An Outline of Semeiotic:

My studies have led me to these working hypotheses. As a general background finding, Peirce's theory of signs is a rather large undertaking.

This is in contrast to a common way of regarding his Semeiotic: as only a small part of his production, situated within the Humanities as we understand them today, involving Hypoicons, or Legesigns, or other supposedly strange word-creations, used to sort representations into appropriate classes. I conclude that for the most part, that approach is a dead end, even an unintentional red herring. Unfortunately, some scholars in contemporary semiotics provide examples of this procedure within various attempts to join particular select and isolated pieces of Peirce's theory of signs onto an alternate large theory of a kind that Peirce seriously disconfirmed for many good reasons which he duly advanced. One cannot grasp Peirce's Semeiotic without comprehending the "larger hypotheses" (theories) lying behind it (which it presupposes and employs and incorporates).⁴ The evidence in support of this conclusion is located in the many instances of semeiotic con-

3 P 107 in Comprehensive Bibliography.

4 A good introduction to relevant issues may be found in Susan Haack 1998.

cepts being informed by, or bolstered by, considerations and arguments arising throughout most of Peirce's System of Science which is presupposed by his theory of signs. Peirce's autobiography⁵ is a good summary of this matter.

The discipline of Semeliotic is not an isolated piece of Peirce's production which can be hitched to any large hypothesis (theory) one might arbitrarily select. The assumption—that Semeliotic is a free-floating orphan for any generous big-theory parent to adopt with no harm to the orphan or its effectiveness—is wrong. The truth is that Semeliotic is no orphan, and not a separable piece, because its bone and sinew is supplied by the whole of Peirce's big theory, which is a matter of empirical science (although in a wider sense than usually understood). Of course a large theory has the logical status of a large-scale hypothesis made up of a combination of smaller and previously confirmed lesser hypotheses; on Peirce's approach, a large hypothesis (or theory) is not a "view", but a growing body of confirmations being processed by the community of scientific intelligences. He often expressed chagrin that some of his friends could not understand that point.⁶

But, the present outline is best undertaken from its starting point. (By the way, my goal here is to picture the overall pattern; obviously each of the component sections deserve – and for the most part, received, at Peirce's hand – more thorough examination and research.)

The initial benchmark may be truthfully described by this sentence: Peirce was a laboratory mathematical physicist at the level of internationally acclaimed expert accomplishment. After he was introduced to logic at age twelve through devouring Whatley's volume⁷ on the subject, his passion for mathematical physics became more focused upon a scientific question that shone the brightest throughout his life: What is the Logic of Science? – By what method(s) does the general community of scientists proceed? Later in his career, Peirce identified Logic with Semeliotic. This means in retrospect, one can revise his early phrase *Logic of Science* in terms of his later preferred terminology, to read *Semeliotic of Science* which one tends to shorten to just *Semeliotic*. He made it quite clear that Semeliotic was conducted only by scientific in-

5 Given in Bizanz 2009, 35-57; see also Scott 2006.

6 Thus, one finds Peirce scolding William James just for that error, see Peirce 1992: 26.

7 Whatley 1848.

telligences.⁸ So from the beginning Semeliotic was a science designed for persons of a scientific cast of mind. For Peirce, if one was only interested in sorting "views," or shuffling through lists of stipulative definitions, or if one was not testing hypotheses, one could not be a practitioner of semeliotic; paraphrasing Plato's sign above the Academy entrance, the posting above the door of Peirce's proposed summer school for Semeliotic at his homestead Arisbe near Milford Pennsylvania, might have read: *Persons lacking a scientific intelligence may not enter.*

The fundamental feature of such minds is what Peirce called the Will to Learn—the capacity to revise one's beliefs as guided by public tests, the outcomes of which are controlled by reality (as opposed to control by one's ego).⁹ Thus if a student of Semeliotic named Betsey were asked "How does the process of communication operate?" she might reply (being a scientist with the Will to Learn), „I don't know, but let us work together to discover what is really involved when we communicate."

One can imagine this question being asked of two other persons, Fred and Norbert. Fred answers, "Communication is a stimulus and response process, „while Norbert states "It is the passage of information from a coder to a decoder." After making those statements, Fred and Norbert are aware that they disagree; however, their response to that development is a mutual resolution to co-exist peacefully, meaning they intend to take no steps to resolve the disagreement using reality-based tests of any kind. The scientist, Betsey, observing this conversation, remarks that neither Norbert nor Fred will be able to practice Semeliotic because neither has the Will to Learn, each lacks a resolve to discover a reality-based answer. This was Peirce's understanding also—if one lacks the laboratory mindset, one will not be able to participate in his science of Semeliotic.

Because Semeliotic is a derivative of Greek *seme* or *seed*, speaking of roots of that science will not be a misplaced literary image. According to Peirce, all science, including Semeliotic, originates in human common sense and instinct. His notion of common sense has two principal features: there is a basic method component he labeled *logica utens*, and there is a collection of beliefs (cultural universals) common to all normally functional

8 For example, *Collected Papers* 2.227.

9 Peirce 1995: 170 f.

humans which he labeled *original beliefs*. Here are some examples of original beliefs.¹⁰

- i. There is some kind of order inherent in the universe.
- ii. There are other beings of some sort with whom I can communicate in some way, and they with me.
- iii. The universe is comprehensible in some way.

As for *logica utens*, it is a largely untrained, untutored, even unconscious, perhaps instinctive, problem-solving ability in normally functioning humans (another cultural universal) manifested in activities such as learning to walk or learning to talk.¹¹

Common sense, with its elemental problem-solving ability prepares one for mathematics, the study of diagrammatic thought.¹² This is the general method of developing a model upon which one can experiment to gain hints about an analogous bundle of relations under study outside the model; one then tests consequences of such hypotheses within the model environment, and if successful there, one tests the target bundle of relations to see if the similar analogous consequence is observed there. Euler diagrams for study of syllogisms provide an excellent simple example of the method of diagrammatic thought. Euler's model is based upon sketched circles, the inner areas of which are understood by the scientists manipulating them as representing all the members of a previously identified class. Then by means of another sketched circle representing a second class, the two circles may be located on a sketchpad to display relations between those two classes, based upon inclusion or exclusion of circles placed so that circle relations are analogous with corresponding class relations in the world being modeled (the relations involved in a basic syllogistic argument pattern). It is well-known that validity or invalidity of various syllogisms can be determined with this method. Perhaps it is not so well known that this is an excellent basic example of Peirce's notion of diagrammatic thought, an important notion underlying both Existential Graphs and Semiotic (because a Representamen is a model or diagram of its Object to its Interpretant, the *Sign* being the entire triadic relation—not only the Representamen). Suffice it to say, at this point we find that Peirce's Existential Graphs is also a fine example of diagrammatic

¹⁰ Ketner 1972.

¹¹ Bisanz ed. 2009, "The Architecture of Theories," 58-69.

¹² At this point a reader might find useful Peirce's own discussion of these matters in Bisanz ed. 2009: 43-57. Hardwick ed. 2001 is also a good source.

thought; indeed, with its built-in capacity to model relations, it became Peirce's basic modeling method for Semeiotic which is the study of triadic sign relations (not fundamentally or merely the study of types of representamens).

A great deal of guidance for Semeiotic and hence Existential Graphs arises with Phaneroscopy. Two important relevant results are the NonReduction and Completeness theorems which form part of the basic elements of Semeiotic.

[Nonreduction Theorem (NT)] *No genuine triadic relation may be constructed solely from dyadic relations.*

[Completeness Theorem (CT)] *Any relation of adicity four or higher may be constructed solely from triadic relations.*

Peirce established these results using a part of the Beta section of Existential Graphs. Later work has confirmed him in the accuracy of these important conclusions now active within the science of Semeiotic.

By 1960, based upon work by W. V. Quine¹³, many persons had begun to doubt these results by Peirce-theorems (NT) and (CT). However, Peirce's results have been sustained by Herzberger 1981, Ketner 1986, Burch 1991, Correia 2008, Dau and Correia 2006, and Correia and Poeschel 2006. Indeed, Burch also showed that despite claims to the contrary, Quine's results do not disconfirm Peirce's results, and indeed the two sets of results are consistent with each other. Additional consequences relevant in Semeiotic are described by Ketner¹⁴, and Bell 2004, plus Bell and Ketner 2003, 2004, 2006 (Semeiotic applied in physics). This sequence of work-along with other studies by Royce, Cohen, Fisch, Eisele, Ransdell, Brock, Percy, Haley, Scott, Shapiro, and others – well illustrates the hypothesis-testing nature of Semeiotic, and how since Peirce's beginnings it has made cumulative progress in the observational, experimental sense. Contrary to those who say otherwise, there is a flourishing Semeiotic (separate from semiotics) that is both contemporary and scientific (confirms and disconfirms hypotheses, which are then used in later experiments).

Peircean Esthetics considers issues involving purposive aspects of an inquiry (an inquiry being a course of study of a question by the scientific intelligences within a community, such

¹³ Cited in Burch 1991, chapter 10.

¹⁴ In Samway ed., 1995: 256-284: explanations of triads must be in terms of other triads, and not in terms of dyads only; see Explanation Thesis below.

study being guided by reality). This first of his Normative Sciences is related to the Principle of Predesignation: An inquiry must begin with a predesignated question. Negatively speaking, there is a fallacy known as Failure to Pre designate. Lacking a question prior to an inquiry, implies that one will have no means for sorting relevant from irrelevant data – everything becomes a datum if one does not pre designate. Failure to Pre designate often underlies another common violation of the ethics of science, a process known as “Cherry Picking” (selecting data that one “likes”).

Peircean Ethics studies the factor of control toward a purpose. The four methods of resolving doubt Peirce outlined in “Fixation of Belief” provide good basic examples sufficient for a broad outline.

TENACITY

Esthetics: preservation of ego’s current beliefs

Ethics: self-censorship, forbidding questioning

Truth: ego’s current beliefs.

AUTHORITY

Esthetics: beliefs aligned with those of an authority approved by ego

Ethics: social censorship, force, propaganda

Truth: beliefs of the authority (often a list).

A PRIORI

Esthetics: beliefs of ego’s social group

Ethics: conforming via peer pressure

Truth: propositions agreed upon by the group.

SCIENCE

Esthetics: concrete reasonableness

Ethics: minimize ego-influence while encouraging questioning, devise tests against reality within a group of qualified collaborators, communicate clearly, reality decides answers to doubts (not egos, or groups of egos), build on previous findings.

Truth: accurate description of reality, based upon results of the process of inquiry.

Table 1: Purpose and Control in Peirce’s Four Methods of Inquiry

Semeiotic, equivalently Logic (in Peirce's broader sense), is the last Normative Science in Peirce's organization of Research Sciences. According to this structure, the results of prior sciences in the listing are presupposed in Semeiotic. The first sub-branch of Semeiotic, Speculative Grammar, deals with the basic concepts and meanings of Semeiotic; the second, Critic, studies argument relations; the third, Methodetic, concerns the methods of science (including comparative study of nonscience methods).

Metaphysics is listed after the Normative Sciences – it deals with the concepts that arise in all the sciences such as law, causation, chance; again, this is a science project, not a philosophy project. Perhaps it would be fair to say that Peirce regarded philosophy as arising out of science as it develops over history; he did not subscribe to the notion that philosophy arises first then dictates conditions to science.

Of those concepts basic to science, the notion of **Real** is a very important one.

Real is understood to mean whatever descriptive aspects some item might have which are independent of any ego considerations on the part of any given single observer of the item. In many daily conversations, the word *exist* is used as the exclusive descriptor for reality, but in Peirce's approach, *exist* is a narrower concept which covers everyday objects such as baseballs and polar bears. Items that exist in that sense are indeed parts of the general collection of *reals*. But at this point in Peirce's proposal, there is an important departure from the commonly accepted understanding of *exist*. In the common approach, there is an additional condition, namely: all of reality is composed exclusively of such existents (objects such as baseballs and polar bears). Peirce's approach parted company at this point: his hypothesis was that existents such as everyday objects are indeed real, but there is another sub-class of real items, namely those items which are not existents but which still fulfill his proposal about reality in general. Let us designate these as *nonexistent reals*. Relations—expressed in mathematics, or in language, or in music, or in diagrams, or art – are common examples of such items. Indeed, Peirce regarded relations as the more fundamental building blocks of reality.¹⁵ Peirce suggested that existents such as a Masskrug or a Weisswurst were composed of relations of a particular kind; thus, Relation could be seen as the basic component in Nature. That is, some kinds of relations compose what we call

15 See Samway, 1995. 240-50.

everyday existents; other kinds of relations lack the features of existence, but yet are also real. This brings to mind much of contemporary physics in which the reality of everyday objects such as Sachertorte or Festbier are described in terms of the relations modeled by appropriate mathematical relations. There is no space to consider this issue now.¹⁶

Here are some examples from this additional subdivision of *reals*; notice each is neither a polar bear nor a baseball, but is quite real with consequences that can help or harm quite independently of any single ego's wishes or desires.

1. Some individual person's bank account;
2. The structure of a computer program;
3. A particular system of government;
4. A law of nature, "Force = Mass multiplied by Acceleration";
5. Siegfried loves Brunhilda;
6. Schmidt sold her VW to Brunhilda;
7. Merkel sent a message to Putin;
8. *Modus Tollens* is a valid argument pattern;
9. A Moebius surface when cut in the long direction retains its continuity;
10. John Doe's blood electrolytes are dangerously inadequate.

All of these situations are very common, but cannot be described as everyday objects or solely in terms of everyday objects, yet they are real in the sense mentioned above. If I really have an empty bank account, and I really owe a huge debt, I really am bankrupt, despite my ego-based wishes to the contrary. (Intense ego-based wishes to the contrary is a condition often abbreviated in everyday speech as "He is in denial.") A group of qualified, reasonable, and objective persons, despite any initial disagreements, would be led to the same non-egocentric conclusion if they examined the appropriate evidence with an appropriate objective method – this would be the process observable in a properly functioning Court of Law. Such a group's *convergence* to a conclusion under the control of reality is a method for attaining truth.

Notice this convergence is not mere consensus, in the sense of similarity of vote. The key is that each examiner of the situation is guided not by ego, but by qualifications and ability guided by the real conditions. In other words, there are at least two senses of the term consensus: mere agreement in content, versus agreement reached under the control of nonegocentric realistic obser-

16 But compare Bell and Ketner 2004, 2006.

vation and open, sound argument amongst scientific intelligences. Some commentators regard Peirce as one who proposed a consensus theory of truth, but they typically mean *consensus:A* in the sense of mere agreement, which is an approach he rejected. If one is careful to insist upon his sense of *consensus:R*, namely convergence under the control of reality (as opposed to the approach he rejected which would be convergence under the control of egocentric factors), then he could be described in terms of that stronger sense.

Test Cases for Semeiotic:

We turn to consider some other events from everyday experience as test cases, because the basic phenomenon at hand here is found widely throughout life.

- Why would typical citizens of a nation be uncomfortable with disrespectful activities involving the national flag – burning, trampling, tearing?
- Why do I keep my father's nonfunctional pocket watch in a special drawer?
- Why does a person grieve when a dear one is lost?
- Why are there ceremonies consecrating rings or other artifacts – marriage, going steady, establishing a relationship?

These are all familiar events in everyday life. Strict materialism has no explanation for these and many other similar everyday events. For a materialist, a flag is just cloth, a human being is but a body, wedding rings and anniversary necklaces are mere stuff, a relationship is just a mark or a name or a sound. But the strict materialist's interpretation of these commonplaces goes against the perception of them by typical persons. In a vigorous and thoroughly enacted materialistic understanding of science, there is no basis for such common, everyday phenomena. To live ordinary life as a strict materialist would be a vast incoherence and inconsistency. A thoroughgoing materialism appears to force a scholar sincerely advocating it into a schizophrenic life style wherein chemical or physical objects and reactions are real enough, but the national flag, a wedding ring, a relationship with a sweetheart, are nothing – literally "not-a-thing."¹⁷ If matters such as these are

¹⁷ This relates to Walker Percy's exceptionally penetrating question, raised (along with others) in his 1983: 85-126).

vital aspects of daily life, and if scientific materialism (scientism¹⁸) has no place for them other than as the sorting bin labeled "Items to be ignored", then it appears that a basis for science other than materialism is required because that approach has a gaping hole in it. Semiotic is the large hypothesis Peirce advanced as an alternate basis for science.

The things that strict materialism wants to ignore are precisely many important things that most persons do not want to ignore, and do not ignore, and rightly regard as important; the examples we are considering here fall within that larger collection. Contrary to the claims made on its behalf, scientific materialism (scientism) is seriously lacking in rigor.

A practitioner of scientism might reply, "But in a laboratory we can restrict our attention to only the realities of material items." Indeed, many persons think this is possible. However, such a restriction is not possible, because within the practice of laboratory work, many non-material realities are required for the laboratory to function. Here are some examples: Predesignation of the question under study; Avoidance of personal biases, or prejudices, or interests that would interfere with open-minded testing of hypotheses; Proper and clear communication between laboratory colleagues; Considerations within the Ethics of Science (Thou shalt not fudge thy data, or searching with equal vigor for both confirming and disconfirming instances). Notice that within these examples one finds a number of non-existent but real items, many of which are relational in nature.

If one blurts ahead with a materialistic program (either noticed or un-noticed), then one resolves blindly to follow the larger theory of scientism held as a background large hypothesis which will be untested and therefore somewhat of the nature of a dogma (an enforced belief). It is a serious fallacy to dogmatize one's large hypotheses, either through ignorance of them, or by conscious choice. Big hypotheses, often called theories, should also be open to test, especially since they can easily slip into the un-noticed background of the process for testing small hypotheses of which one is directly aware. The big hypotheses blend with each relevant small hypothesis and the entire bundle should be tested. If one is unaware of a theory standing behind a small hypothesis under test, one will not be aware of the specific nature of the hypothesis being tested: which is actually the un-noticed theory plus the noted relevant small hypothesis. *Big hypotheses not noticed* are in

18 On scientism, see Ketner 1999: 22-27.

many ways similar to *enforced belief in big hypotheses (a dogma)*; one might say the former are somewhat self-"enforcing," whereas the latter are consciously enforced through planned procedures. Large hypotheses can be tested, but only if their status as un-noticed dogma is removed. If the dogma condition is retained either overtly or inadvertently, a psychic process of compartmentalization often appears. Such a phenomenon often occurs in connection with materialism.

In the process of preserving and thinking about non-existent real items materialists regard as throwaways, many persons have relied upon weak band-aids to repair the gaps materialism leaves. One such repair-strategy is supernaturalism, offered instead of materialism as an appropriate ontology to explain the kind of test cases we are considering. Does it provide an appropriate ontology for those cases?

No; and here is the reason. Supernaturalism is, in one of its crucial aspects, an explanatory procedure. An event in daily life might puzzle us, which requires explanation – for example, Why did the Trojan War happen? To execute a supernatural explanation, one uses the language of material-in-a-world, but now set in a special world other than the one we live in each day. This other world is the supernatural world. In that world, *any thing we can imagine* is allowed. There are no controls on the content or nature of a narrative someone might present about a supernatural world. (In Peirce's terms, this would be a technique lacking an Ethics.) For instance, we might decide to say that in the other world, some powerful persons were angry at the Trojans and wanted them to suffer, so these powerful beings caused events in our world such that the Trojans found themselves at war. Indeed, with this strategy, anything can be "explained", if by *explain* one means *present an uncheckable story about the puzzling phenomenon*. And this is the defeat of supernaturalism as an explanation technique: because it can "explain" anything, it actually explains nothing. Therefore, it is rejected as a rational or objective or reliable explanation strategy.

Supernaturalism is the last desperate gasp of a strict and crude materialism, an attempt to keep all the trappings and assumptions of materialism but within another world so rubbery that anything there is possible. The phenomena which supernaturalism is usually invoked to explain, therefore, are delusional, then? Some such phenomena may be chimeras, however, with a rationally viable ontology, there may be reality in some phenome-

na for which supernaturalism is usually, but inappropriately, invoked.

As a setting in which to explore alternatives employing Semelotic, let us return to the everyday events recently mentioned as examples. The best strategy is to drop the inadequate and disconfirmed big hypothesis of materialism or scientism, and put in its place something scientific such as Peirce's Semelotic which allows for and facilitates scientific study of nonmaterial reals such as relations.

* * * * *

Most Americans regard the flag of their country with respect. This general behavior pattern can be contrasted, for instance, to our attitude toward paper clips or safety pins. If one goes bad, we toss it in the garbage without a second thought. But if an ordinary flag wears out, to proceed properly it must be burned in a prescribed way. A special flag, such as the exact flag replica *Old Glory* (raised at Fort McHenry in the war of 1812), described in the national anthem of the United States, gains even more respect and special treatment.

A broken rubber band is discarded because it is no longer useful. My father's broken pocket watch, despite being no longer useful as a time piece, is kept in a special place.

Words, used to describe a promise in a marriage ceremony, can be life changing. Graduate students work years in order to have a piece of paper that makes certain statements and is signed with approval by particular academics.

Surely words, flags, watches, wedding bands, diplomas, and many other similar things, are more than mere material physical things or physical events. Everyday life is based on these other, nonmaterial factors. Even thorough materialists get married, grieve, honor a flag, speak important words, obtain an advanced degree, or cherish some keepsakes.

If one adopts a relational ontology, all this – as well as material objects – becomes quite understandable and functional. Existing things such as material objects are real. Yet nonexistent relations also are realities. Our system of government – and other systems such as The Economy, The Legal System – are not material things, but a complexus of actual relationships (including relations among relations). A computer program is not the material on which it is recorded, but a complex system of relations embodied upon the media appropriate for a particular computing device.

Such relations are also realities, however they do not exist (they aren't material things). Thus reality can be divided into two grand classes: real things that exist (such as rocks and paper clips) and real things that don't exist (such as everyday relations: "The cup is on the table", or "Suzy loves Fred"). The opposite of reality is *figment*. Something is real if it has properties independently of any single ego's wish or desire about what those properties might be, or might not be. A good example: last night I dreamed I flapped my arms and flew across a meadow – that I *had* such a dream is a reality, that I actually *did* those things is a figment.

Sign relations are common nonexistent realities and are among the most important relation types. A *Sign* is the complete triadic relation involving an Object (in the sense of an object of discourse – the item we are considering), a Representation of that Object, and some Interpretation of the Representation of the Object. Notice that the word *sign* is used here to refer to a real triadic relation of a particular type, and not to a single item (the representamen) that represents something else (the object) to an interpretant.

There are some simple terms suitable for discussing a sign (I use this word hereafter in the sense of *sign relation*). The most basic items are *Object*, *Representamen*, and *Interpretant*. In a sign relation, the Object is the topic being considered (the object of discourse), the Representamen is some representation of that Object, and the Interpretant is an interpretation of the Representamen. (Notice that the word *Representamen* is functioning here as would *sign* in a narrow sense, as something that represents something else). An example of a full sign relation: if you say "Hello" to me, your hello is a Representamen of your intention (the Object) to greet me, which *hello* I interpret as your greeting (my interpreting it as such is the Interpretant in this case). Thus, in a sign relation, there are four realities: the Object, the Representamen, the Interpretant, and the fourth is the triadic sign relation itself. We are now sufficiently prepared to lay out the basics of the more direct connection between Semeiotic and EG as a Logic of Relations.

The Alpha portion of EG is what is usually known today as Truth-Functional Logic – the logic of complete simple sentences, or compound sentences composed of simple sentences and a limited number of connecting words such as *and*, *or*, *dental*, or *implies* used to link simple sentences into compound sentences. *It is raining* is an example of a simple sentence; *It is raining implies I am sad* exemplifies a compound sentence. The basic element of

analysis goes to no smaller detail than simple sentences or their compounds or their negations (denials). For instance, the following sentences contain interesting internal features which can be analysed in the Beta or Gamma portions of EG; however, in Alpha EG, each is but a simple sentence which can either be true or false – no additional details of analysis of sentence internal structure is essayed in Alpha.

Sentence	Alpha EG Notation
(a) It is raining.	R
(b) All rainy days are fun for ducks.	D
(c) Rainy weather causes my headaches.	H
(d) Dorothy sold her umbrella to Bob.	B
(e) Possibly Dorothy loaned her rain coat to Bob.	L

Sentence (b) involves a relation between classes operating at less than full sentence scope. In Beta EG, (b) can be analysed as the negation of (h), based on the preliminaries of (f-h):¹⁹

— R

(f) Something is a Rainy day.	Beta EG Notation
-------------------------------	------------------

— (D)

(g) Something is not fun for Ducks.	Beta EG Notation
-------------------------------------	------------------

(R) — (D)

(h) One item is both a Rainy day and not fun for Ducks.	Beta EG Notation
---	------------------

In (h) the "Somethings" of (f) and (g) are now known to be one and the same item, whereas the previous states of information in (f) and (g) were indefinite or indeterminate as to that issue. (By the way, when Peirce wrote *determine*, he usually meant the process of making a present state of information more definite; typically

¹⁹ See Ketner, 1986 for the notation.

he did not use *determine* to mean *A causes B* - thus, in this sense, Sherlock might ask Dr. Watson to determine the name of the chap across the street wearing a red hat - here, Sherlock is not asking for a causal sequence to begin, but is asking Watson to supply additional new information about *that man*.) Now sentence (i), which is the negation of the Particular Negative (h), expresses the earlier required Universal Affirmative sentence (b) in Beta EG.



(i/b) All Rainy days are fun for Ducks. Beta EG Notation

The logic of classes becomes in Beta the logic of monadic relations (often properties). One can also now comprehend why Peirce sometimes described Alpha as the Medadic Logic of Relations: Alpha sentences are analysed only as fully bonded (combined) relations. A medad is a relation whose valencies, or connectible locations, or *loose ends*, are all occupied with bonds or connections. A monad is a relation having one location available for future bonds, such as either (f) or (g). If those two become bonded as in (h), the resulting sentence is a medad.

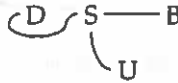
Sentence (c) brings us to dyadic relations. A relation, for Peirce, is a fact about some number of items. Of course, facts are the conclusions of successful scientific inquiries. At the end of a successful inquiry, one concludes, on the general plane, that *if a particular activity or performance occurs, then a result of a particular identified sort will appear*. While one is studying to ascertain if some particular hypothesis Φ is confirmed, the undertaking and activities will have marked processual overtones. But once the inquiry is successfully terminated, the result of the new process is the focus of attention, and Φ begins to be discussed as a noun-like item, particularly because as a result, Φ will be used, now as a *fact*, in future inquiry processes as part of initial evidence or resources. Such a discovery moving from process-talk to noun-talk is what Peirce identified as *Hypostatic Abstraction*. Relations, as facts about a particular number of items, are hypostatic abstractions.

Sentence (c) can now be analysed in Beta to illustrate its relational structure as a *Dyadic* relation.



(c) Rainy weather Causes my Headaches. Beta EG Notation

In sentence (d) we have a fact about three items, a *Triadic* relation:



(d) Dorothy Sold her Umbrella to Bob. Beta EG Notation

Because of the [Completeness Theorem], relations of adicity four or more will be perhaps useful, but redundant, because quadrads and above can be constructed of triads only. For an example, hold up the thumb and first two fingers of each hand, then touch your thumbs as if bonded; behold, a quadrad. The relationship is:

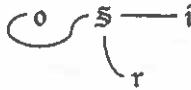
An N-ad, where N = 4 or more, can be constructed from N-2 triads.

Sentence (e) would fall under the third or Gamma section of EG, which adds capacities to analyse modalities, or for expressing items such as graphs of graphs. (We shall not consider any elements of Gamma here.)

The three sections of EG are retrospective; that is, Gamma includes but goes beyond all the tools of Beta and Alpha, and Beta includes but goes beyond all the tools of Alpha; Alpha can be considered as including all the tools of one's instinctive logical abilities and elements of common sense in a setting of a dialogue between two scientific intelligences who are examining a topic (mutually observed in common between them) according to the ethics and esthetics of science. Thus again we see that Semeiotic and EG have deep roots and long legs.

We have also arrived at a point for perceiving that Beta EG provides the tools for launching Semeiotic, the study of Sign Relations and processes involving Sign Relations. The general Sign

Relation is a triadic relation, expressible in Beta as a sentence describing a fact about three items, an Object, a Representamen, and an Interpretant.²⁰



(j) General Sign (Sign Relation)

Beta EG Notation

In the overall development of Semeiotic within the tools of EG Beta, it is at this point that the Nonreduction Theorem and the Completeness Theorem come strongly into use. These are perhaps the two most important Theorems in Semeiotic as a scientific activity among scientific intelligences. An important additional consequence from them for Semeiotic is:

[Thesis 1] *Any explanation of events or items involving triadic relations must be in terms of resources that include at least some triadic relations.*

That is a third important result in addition to NT and CT. It runs counter to a bad habit in science which always and automatically seeks to explain in terms of resources conceived as containing only dyadic relations such as causes (a process often described as Reductionism).

Within science, and particularly Semeiotic studies, we will not break out of the world containing triadic relations into an explaining resource exclusively composed of dyadic or monadic relations. Explanation of intelligible phenomena requires some triadic relations (typically Sign Relations) within the explaining resources.

Consider the reversed pattern: If a scientific intelligence (a Mathematician or a Chemist or a Semeiotician or an Electrician) discovers some intelligent relationship about nature—for instance, Ohm's Law that in a Direct Current Circuit, Voltage equals Amperes multiplied by Resistance—the item prior to its discovery was in Nature, and was there already as something that

²⁰ I will be using blackletter typeface to indicate generalization. Thus, in (j) S is the generalized triadic sign relation, o its generalized object, r the generalized representamen, and i the generalized interpretant.

could be comprehended by properly adjusted scientific intelligences. Try it another way: If the phenomenon in nature, that is conceived as a candidate for discovery as an intelligible item, is a phenomenon composed exclusively of dyadic relations (which it would be on the materialist or physicalist large-scale hypothesis), then it will not be expressible within the explaining system or language, which, in order to be intelligible, must have some content of Sign Relation (recall that dyads bonded with dyads produce only more dyads, never a triad). Or another form: A successful explanation requires some Sign Relation in the material being explained and some Sign Relation in the explaining material.

These are logical findings of Semeiotic/Beta EG, which, if correct, apply to all science. So, we may add additional Theses that flow from the Nonreduction and Completeness Theorems and some facts of the history of science:

[Thesis 2] *Any body of phenomena to be explained must contain some triadic relations, else an explaining resource (which must contain some triads to be an explanation) would be constructed only from monads and dyads in contravention of NT.*

Because explanations of Nature are possible and are actually accomplished (as profusely shown in the History of Science), it follows that

[Thesis 3] *Nature is not composed exclusively of dyadic and monadic relations.*

Beta EG provides the analytical capacity for working with various kinds and combinations of Sign Relations. Here is a brief sampling of three of the more basic types Peirce discerned.

Some Sign Relations are iconic: In *Icons* the Representamen is similar to the Object, and through this similarity the Interpretant functions (example: photograph).

Some sign relations are *Indexes*: there is a causal relation between the Representamen and the Object, and that connection is grasped (interpreted) by the Interpretant: for example, fire (Object) in the distance causes smoke (Representamen) which (the *R*) is seen by an Interpretant (fire watcher) who interprets *R* to mean "There is a fire."

To show how this example of an Index would appear in Beta EG, the *lingua franca* of Semeiotic, the *Scientific* study of Sign Relations and Processes, consider this thought sequence of a scien-

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tific intelligence we shall designate as *E* (remembering the Watcher in a Fire Tower in Walker Percy's novels)²¹

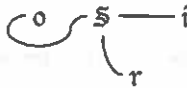
Semeiosis of a Scientific Intelligence (E) in Beta EG



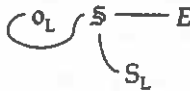
[1] At time *T*, there is no Smoke at specific location *L*.



[2] *T* + *x*, there is Smoke at *L*.



[3] General Sign Relation.

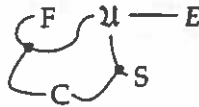


[4] *E* (a Scientific Intelligence) wonders why there is smoke at *L*.

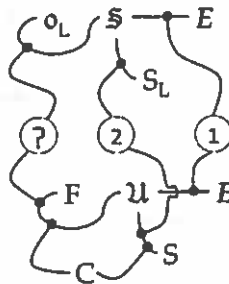
— C —

[5] Something Causes something.

21 I shall employ Roman typeface uppercase to indicate particularized components, and lowercase to indicate a more particularized instance.



E understands that generally Fire causes Smoke.²²



[7] *E* guesses (Abduction) that perhaps there is fire at L.²³

[8] *E* arranges a test (Induction, or Experimental Design) of the hypothesis "There is a fire at L (?)" ; *E* telephones someone near the possible fire site, asks for a report.

As in this case, a Semiclosis is often a sequence involving all three of the inference types Peirce identified—Abduction (or guessing, which produces a hypothesis for test; Abduction does not produce a fact already loaded with truth), Deduction (of expected

22 At this point a very interesting triadic relation (which Peirce regarded as quite important) makes its appearance. It is the Beta graph of *Teridentity* (triple Identity) diagrammed as a black dot with three Ends (for example, occurring near F and S and E).

23 In (7) the three circles indicate the following: at (1) the two *Es* are identical in that they are the same person, concerning (2) *Sl* is smoke at L whereas *S* is smoke at a more general level, and the line identified by (2) has a *bridge* (or nonintersection) with the line from U to E; and (7) indicates the line or connection that is hypothetical and awaiting a test from Induction.

consequences of a hypothesis), and Induction (or experimental design for conducting a test of consequences of a hypothesis). Predesignation of a puzzling problem is also shown here in that at [1] and [2], *E* has noticed a contradictory sequence at L of first NoSmoke and then later Smoke. This suffices to initiate the question, which then aids to set the esthetics and ethics of the Semeliosis that follows.

Then there are *Symbols*: a Representamen represents an Object by virtue of the fact that the Interpretant so grasps through a habit that it (the *R*) does. For example, the Representamen composed of alphabetic letters **TOOLBOX** doesn't look like a tool or a box, has no causal connection to tools or boxes, but really in the English language community it is by habit interpreted as a Representamen of a whole typology of boxes suitable to contain or store tools.

The little word *IS* bears some examination. Strict materialists typically allow it to perform only limited functions.

IS can be used to ascribe a property: "The stove is black."

The word *IS* can be used to designate an identity relation: "Mark Twain is Samuel Clemens."

But there is a third case, very common in everyday life and language, a case usually overlooked by materialists.

IS can be used to establish or notice a Sign Relation: "Let us habitually realize in the future that this newly discovered species of brown bat is *KnoxJonesiana Texanlensis*." (Ketner makes no claims about his ability as a Latin scholar.)

The first institutionalizing of a sign relation is often designated by the word *IS*. Percy noted this clearly.²⁴ When in Percy's favored example, Helen Keller's acquisition of language, Helen initially recognized that the word *water IS* water, she recognized this sign relation sense of *IS*. She was not realizing that water is a property of the word *water* (a falsehood), nor was she realizing that the word *water* is numerically or extensionally identical with water (another falsehood). She (the Interpretant) was realizing that the Representamen *water* is in a sign relation with the general type WATER (the Object) of which the liquid in her hand is a token. She became aware of the generality inherent in the kind of sign relation known within Semeliosis as a *Symbol*. The generalizing aspect of Symbols and their wide applicability tells us why Helen quickly and eagerly asked her teacher for many other symbols.

24 Percy, 1983: 97.

Contrary to materialistic/nominalistic belief, a sign relation is not a *mere* convention or sound or name. One reality leads to another reality when a sign relation is successfully discerned.

Let us return to the example cases. The material that ultimately becomes a flag or my father's watch, or a ring or necklace, or a diploma are ordinary things, with no particular importance, no more so than other similar materials.

How did my father's watch acquire the extra meaning it now has within my family? There was a ceremony—a sequence of speech acts.²⁵ After my father's death, my mother handed the watch to me. She said, in a solemn and serious manner, "This is your dad's watch; I know what he meant to you and you to him; keep this to remember him." This remark is not about the *property* sense of *is*, nor about the *equivalence* sense of *is*, but it was a use of the *sign relation* sense of *is*.

So indeed, this piece of cloth *is* the flag of my noble democratic home. This unadorned circlet of gold *is* my grandmother's wedding ring. This piece of paper with ink scratches *is* the diploma I sacrificed for and struggled to attain. This useless and nonfunctional set of gears *is* my father's pocket watch which he carried safely through the Second World War.

At this point, the hypothesis of this essay is placed before the community of scientific intelligences. It is not now recommended for belief; however, it is ready to be tortured diligently to determine its strength or weakness.

25 See Brock, 1981.

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