THE BEST EXAMPLE OF SEMIOSIS AND ITS USE IN TEACHING SEMIOTICS

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"You misbegotten wretch!" they flung back at him. "Are you trying to teach us?" And they threw him out. (John 9)¹

INTRODUCTION

Following this sentence is a series of marks not in the English language; do any of you, dear readers, understand anything that it signifies?

For those of you who are not affected by the real potential significations that it has, I invite you to join me in an experiment in Peircean semiotic (seem-eye-OH-tick), his comprehensive general account of semiosis processes (or sign-action processes).

These marks are an instance of the first or Alpha part of a system of logic Peirce invented and developed to a considerable extent. He named it Existential Graphs (EG for short). Because of the frequency and manner in which he often uses the system in his mature writings, it seems safe to conclude that he thought it was the best example of semiosis. We can clearly see that he regarded it as a moving picture of semiosis by recalling that in P 26, Peirce stated "All thought is in signs," which I understand to mean that each instance of thought or thinking is an instance of the kind of process called semiosis. We also recall he stated that EG was a moving picture of thought (MS 298, ISP 13). If we make a valid syllogism with these two comments, we conclude that EG provides a moving picture of the process called semiosis. Maybe this is one of the reasons he seemed to think it to be the best example, for after all Peirce clearly regarded signs (semiosis) fundamentally as processes, not as static entities.²

Will you then join me in the experiment? If so, take another look at the marks above (and not again until told to do so), then permit me to

conduct you by beginning with remarks about the purpose of logic. (We need that digression, for EG is an instance of logic, an exemplar of logic.)

THE PURPOSE OF LOGIC

"What is the purpose or goal of the study known as logic?" This is the most important issue in the entire subject, and one that is nearly forgotten by many of its contemporary practitioners. Yet a new student of logic quite naturally has the topic in mind. Let us pretend to be such students. We shall seek to understand the question by first trying to discover the kind of settings or situations in which such a question might be raised.

Questions like this come to mind when the context involves a situation in which one is selecting a method for resolving doubts. That partially explains why such a question naturally arises when one becomes a student of logic for the first time. One thinks somewhat as follows: "I have made it to this point in life with my own thinking methods which seem appropriate to me—what is the method which this new study will require of me? Have my methods of thinking been unlogical all this time, only to become logical after completing a study such as this one?" Several other topics are related to this issue. For instance, persons often also wonder "Are human beings naturally logical? Does each person have to learn logic, or is it an instinctive ability with us?" For now, we shall bypass these related matters in order to concentrate upon "What is the Purpose of Logic?"

We can gain further insight into this issue by considering in basic terms how our thought life seems to occur. That is, if we are interested in knowing more about the basic purpose of logic, and if logic seems to have something to do with our reasonings, because all of us are reasoners, it follows that all of us have had experiences which when remembered will help us answer this question. The first thing we might note from our experiences is that as long as we do not encounter any problems or doubts or surprises, our beliefs and procedures for various aspects of our lives seem quite satisfactory. In the condition we call belief or believing, we do not have a need for a method of thinking through a difficulty, because we do not perceive that we have a difficulty or a problem. Yet at other times, observations of facts now at hand may bring doubts. In that state we may sincerely wonder whether a particular belief we have had should be retained or another new belief acquired to replace the old one. This case, the situation of doubt or questioning, is the time when we must also select a method for resolving doubt.

This is true because of the nature of doubt. Doubt is actually a condition of too much belief. If we can consider an imaginary sequence of onset
of doubt, you will see what I mean by that phrase. The background for a
doubt is belief. That is, before doubt occurs in regard to a particular belief,
we will have had that particular belief for a while. And what is a belief?
It is a habit such that when a particular kind of situation occurs, we will
respond, or will tend to respond, in a particular kind of way. Beliefs are
“if – then” relationships. We know a person believes in a particular way,
if when a specified situation occurs, then that person responds (or tends
to respond) in a specified way. For an example, suppose we believe that
ice melts into water. Suppose further that one day a friend shows us a
piece of ice. As we observe this ice, we find that it does not melt at all, yet
slowly after a while, it gets smaller and smaller, until finally no more ice is
left. Where there was once a solid piece of cold ice there is now nothing at
all, not even a puddle of water. This new experience with ice is an example
of the second kind of thing to note about a typical initiation-of-doubt
sequence. This surprising, unexpected, experience tends to produce in us a
belief that “Ice does not melt.” But this is in direct conflict, or is incon-
sistent with, our older belief, “Ice melts.” In other words, our long ex-
perience with ice tells us that “Ice melts,” yet our recent short-term
experience with ice is telling us that “Ice does not melt.” We feel confused,
because we see that our experience and observations tell us that
“Ice does and doesn’t melt,” or “Ice melts and ice doesn’t melt.” If we
want to have anything to do with ice in the future, we think it would be a
good idea to figure out which of these conflicting beliefs is the correct
one. We then seek for a way to discover which of these two beliefs is true.

Several aspects of this example could be considered, but for now let us
stay with the topic of methods for resolving doubt. Doubt is conflicting
beliefs, each belief seeming to have some evidence in its favor. If we use
the concept of “method” in the widest possible sense, in order to remove
ourselves from the condition of doubt to a condition of finding out which
of the conflicting beliefs in the doubt is the preferred belief of the pair, we
will use some means, system, way, technique, or procedure—in short, a
method—for making that transition. If we used no method, we would
simply stay in the condition of doubt indefinitely. That is, if we used no
technique whatsoever for making the transition (including pure chance
means) we would not change from doubt back to stable belief. To say that
one uses a particular method is to say that one will consistently employ or
adopt that technique or procedure. Thus, there are a lot of procedures that
could qualify as a method for resolving doubt for some person. Almost
any technique used consistently by a person could be such a method. Note
that a great many of such methods would not give us a correct resolution
of doubt, but would only permit the transition from doubt back to belief to be made without providing assurance that the resulting stable belief is *true*. One could say that the purpose of logic is to study methods for resolving doubts so that the resulting belief is a true one. But that is getting a little bit ahead of our analysis.

A startling fact about the methods used to resolve doubts is that *nothing requires* a person to have one method as opposed to another.³ It is possible that a particular person might adopt any method. To put this another way, there is no cosmic standard or reason or requirement that a person must have a particular method. The method a person uses will either be selected through choice, or perhaps acquired while a child, unconsciously by example from family or friends. In the case of methods adopted unconsciously through example, different traditions around the world create a great diversity. But even these can be considered under the heading of methods chosen, for they are not adopted under any kind of binding requirement, but through a kind of historical or geographical accident of being a child among one particular tradition instead of a different one. Yet even if one’s traditional methods tend to be unconscious, one can become conscious of them through encountering contrasting traditions, thus gaining through awareness the ability to modify them in favor of another method selected consciously. Moreover, traditionally acquired methods can be changed or abandoned, a common occurrence in the process of education. Thus, with the slight qualification associated with methods acquired unconsciously through traditional example, it seems clear that any method a person has adopted for resolving doubt is a method that is selected (in a broad sense), as opposed to being a method that nature or the cosmos (or anything) *requires* us to have. This is to say that there may be a historical cause why we have a particular method, but there is no reason laid down in the structure of the cosmos requiring us to have a particular method. Thus, the method we have is ultimately a method we have chosen, in some sense.

At this point someone might object that human beings are supposed to be rational and that surely we must always use rational methods for resolving doubts. A little knowledge of world history should be sufficient to show that this simply is not the case. If it were the case that some aspect or agency of the universe required that humans always adopted rational methods for resolving doubts, then we would have no nonrational methods. But we do see nonrational methods in many instances. So, there is no such requirement that humans always be rational. Humans are in some cases trying to resolve doubts to obtain truthful results, and some-
times they are trying to resolve doubts without any particular concern that the resulting belief be true.

Armed with the important facts that resolution of doubt requires a method, and that the method used in each case is the result of the doubter’s selection or permission of that method, we can now make a partial list of the more common methods, with an eye toward seeing if any further useful information for understanding the nature of logic can be obtained. Again, we need only reflect upon our own experiences to obtain examples for consideration.

The first doubt resolution method I shall mention, and perhaps the most basic such procedure, is that of following the guidance of one’s feelings. In discussing each of these methods, we shall require some convenient names. Let us identify this one as the method of emotion. It is deceptively simple. It consists in resolving a doubt by selecting from the conflicting belief pair that one which the doubter emotionally prefers. An example of this technique often occurs when a parent is told that a child has done something terrible, perhaps being involved in a crime. The first response of such a parent or friend is typically, “My dear one could not have done that awful thing.”

The second technique we might mention could be called group allegiance. Here one resolves a doubt by selecting the belief most likely to be consistent with the ideas one thinks will be most acceptable to one’s social group. An example of this procedure is what high school students call “peer group pressure.” Thinking that one is rejected by one’s social group is a strong negative state, and this is a principal factor in the popularity of this way of settling a doubt.

Another widespread approach to doubt resolution is what we shall name the method of respect. Persons following this way are guided by feelings of respect for a particular person, or institution, or perhaps some other kind of thing. Often a person may find a charismatic leader and then follow that leader’s guidance with devotion.

Sometimes we find ourselves tending to believe what is fashionable, or consistent with the spirit of the times. We may refer to this as the method of fashion. This technique differs from group allegiance in that this one often operates through unconscious, large-scale cultural or historical influences. And without a serious effort to discover our inherited historical or cultural or social biases, we may find ourselves operating under their subtle unconscious influences when resolving doubts.

We could go on naming many other methods similar to the ones just mentioned—for example, appeals to force, or resolution through chance
(for example, flipping a coin to decide). But it is not necessary to continue this list of methods indefinitely, for we can now see that there are some common factors in these techniques which, when noticed, will aid us in further understanding logic. First, none of these methods makes a distinction between a belief which is correct and one which is incorrect. That is, in each of these methods, the resolution of conflicting beliefs is not in favor of the belief which is correct, or true, or representative of reality. Instead, resolution of doubt by these techniques is accomplished through action of the doubter's ego. One selects from the conflicting belief pair (which is the doubt at hand) the belief which suits ego's feelings, or which places ego more advantageously with ego's social group, or which is most consistent with the beliefs of a charismatic person respected by ego, or which is most consistent with the beliefs of ego's perception of current fashions, or with ego's cultural or historical setting. Second, each of these procedures is based upon the doubter acting to will to believe the selected belief from the conflicting pair. Sometimes one can do this. But sometimes one cannot actually do it, instead one only succeeds in thinking that one has done it. To phrase this otherwise, these methods presume that one can simply turn belief on and off at will. Sometimes this can be done, and sometimes it cannot be done. Of the times in which it is not done, persons may convince themselves that it has been done, thus opening themselves to the condition known as self-deception. In this condition, persons falsely describe their own beliefs. This misdescription or self-deception (deception by ego) is well exemplified in the ordinary phenomenon of hypocrisy. The third factor common to nonrational procedures is that evidence is not considered, or if it is considered, it will only be evidence favoring the belief which ego favors. In order to conveniently refer to all of the methods for resolving doubt which possess the above properties, let us use the name "egocentric methods."

Now it is time to consider the opposite of egocentric methods, the method of objectivity, or objective method. This method also starts in the context of an actual doubt. It is also a common technique, one that we will all use often, so once again we can consult our experience to find examples to analyze. Some of the easiest examples come from ordinary, everyday perception, which is an objective activity in which we constantly engage. Pick out some object in your surroundings, an item that is about the size of your head. Place your thumbnail beside this object. Here you are having a visual experience that tends to support the belief that the object you chose is larger than your thumbnail. Now hold your thumbnail directly in front of one of your eyes, with both eyes open, while still
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looking at the chosen object, so that you can "see through" your thumbnail. Now you are having a visual experience that tends to support the belief that the object you chose is not larger than your thumbnail. If we put these two experiences together, we have a doubt—"I have experienced that this object is larger than my thumbnail and is not larger than my thumbnail." If two persons had had these experiences separately, so that person A says "This object is bigger than my thumb," and person B says "This object is not bigger than my thumb," we would have the doubt expressed publicly. If we were following an egocentric method, person A or B would simply pick the belief each favored, presumably in this example, that which each uttered. Yet notice that as a matter of fact we don’t proceed in this egocentric way. It is significant that young children, who are very egocentric, do indeed proceed as if what is perceived is totally equal to what is really present. But after some informal training in the basic skills of the objective method, children begin to be objective about their perceptions. Since we are objective concerning our normal perceptive abilities, we might say to persons A and B, "If you will consider some further evidence, you may be able to find out which of your conflicting beliefs is the correct one which accurately represents reality." With that goal or hope in mind, we could devise various tests which have the property of repeatability in time and accessibility to the experience of any interested person who might want to try the test. For example, we might make two marks on a stick (a crude ruler) and place this stick first against each person's thumb, and then against the chosen object. Everyone in the room could easily perform this test (publicly accessible) as many times as desired (repeatability). We could conclude from this kind of testing that the correct belief is that the chosen object is larger than anyone's thumbnail.

From this kind of case we can pick out the basic elements of an objective method for resolving doubt. Its first feature is a willingness to leave aside egocentric considerations, to let the evidence, fairly considered, lead one to a correct conclusion, instead of one's ego willfully (even pridefully) enforcing conformity. Anti-egocentricity is an important basis of objective method, just as it seems to be an important feature of genuinely religious behavior. One thinks of several instances in which Jesus (a great religious genius, and a pretty strong logician too) expressed a wish that his personal or egocentric will should be subordinated to the divine will. One could find parallel examples in the teachings of religious geniuses in other religions. A similar spirit is basic to the objective method, except here one subordinates one's ego to what can be found out to be correct or
true. This parallel suggests an interesting possibility—perhaps that which is divine and that which is true are equal in some sense.4

Second, in objective method one has an active hope of finding out which belief is correct. Without hope, one could hardly engage in seeking a true answer to a question. This hope means that we somehow sense that even though we do not now know which belief is correct, there is a chance or a possibility that through work we can indeed find out which is correct.

The third element in objectivity is that of fairly seeking evidence for both of the conflicting beliefs in the doubt at hand, wishing to have the strongest possible set of evidence for either belief so that the correct one can be found. Since we do not know in advance which is the correct one (we would only know that at the conclusion of a successful application of objective method), we have to try to find as much positive and negative evidence as possible for each belief. We have to remain open to new evidence, or evidence from unexpected sources. This feature of objective method can be summarized by saying that if the doubt is to be settled truthfully, it will be settled by evidence fairly and openly considered.

Publicity is the fourth element in this method. To be objective is to be open to relevant considerations from any source. If something is true, it will be true for everyone, and will be equally confirmable as true by any person with a fair or objective mind. Naturally, egocentric persons will complain if a favored belief is disconfirmed by practitioners of the objective method. Many examples of this occurring can be seen in history. A classic example is the fact that many persons egocentrically (selfishly, one could say) maintained that the earth was flat long after objective minds had confirmed that it was spherical. One could say, the fact that (for egocentric reasons) someone still disagrees with an objective result does not mean that the objective result is false, or that objectivity does not work well. It simply means that the person disagreeing in this case is not objective. On the other hand, if a person pursuing a matter objectively still disagrees (for some plausible reason) with a current objective result, that is reason to continue research further until all fair and objective minds are brought to agree.

The fifth point we can note is that the objective method has a distinctive property. Again, if we consider the history of the development of human knowledge in those cases where the method of objectivity has been employed, we find a curious thing happening. At the beginning of use of the method, persons employing it were often in considerable disagreement, beginning the inquiry into a particular subject from diverse standpoints. As the method was used over the years, sometimes for centuries,
and as later students of a subject learned from the work of previous students, the beginning points began to converge slowly until, at the point in which an objective subject reaches some maturity, students of the subject find themselves being in agreement, not because they voted, or chose, or arbitrarily selected to be in agreement, but because they had been brought into agreement by their allegiance to nonegocentric techniques of study and the weight of evidence produced over the years in such a study.  

Finally, we note that the objective method is a skill, and as such it is not something that can be learned through a lecture or theoretical description (although these might help somewhat). Many things to be learned are of the character of skills. And many failures of educational institutions can be traced to the objectively disconfirmable claim that a student should know how to apply a skill after being given a theoretical lecture about that skill. “Say, dumb kid, why can’t you do your lesson—I gave you a brilliant lecture about it in the last class.” This feature of the objective method means that one cannot begin immediately to enjoy the benefits of increased use of this method, because improvements in using it cannot be fully learned instantly through simply hearing about them. One has to practice the method, working through typical steps found in the normal learning pattern for skills. First, one hears a description of the skill to be learned, then one tries to perform the skill. Typically this performance does not work out as well as one hoped it would. At this point, one analyzes the first attempt (without guilt, which teachers often unfortunately lay on at this point—guilt is inappropriate because this is an unavoidable part of the learning sequence). Then one looks for ways to improve. Next one tries again, perhaps doesn’t succeed again, analyzes again, tries again, etc. A teacher is someone who is familiar with a subject and with how learning takes place, and who can assist learners to improve in their practice in developing new skills. A good teacher is like a good coach, who helps you practice on basics of basketball, or tennis, or logic, so that you can become a star in basketball, tennis, or logic faster than if you were working alone.

The fact that the objective method is a skill explains why it usually takes a while to have success in its use. Do not expect instant enlightenment with this method. That, curiously enough, is a promise often held out by ardent supporters of an egocentric method. And, the fact that sometimes progress with use of the objective method is slow, is not a reason that it is ineffective. After all, it took physics about 2000 years to achieve its present state of objective success. Skills in logic can be devel-
oped in considerably less time. Two or three months is usually sufficient to begin to notice real progress, and once the earlier stages are passed, learning generally increases at a faster rate.\(^6\)

What, then, is the nature and purpose of logic? Logic is the study of the objective method for resolving doubts. To be an accomplished logician requires more than to have memorized a description of the nature of logic or of logical techniques. The purpose of logic is to aid us to be logical or objective persons—persons who can think objectively for ourselves. This does not mean persons who can think for themselves in any sense of thinking. It means persons who, when appropriate, can think objectively (think using objective method) for themselves (independently, without an instructor, so to speak). Then we can say that the study of logic is the study of objective methods, and that the purpose of studying objective methods is so that each of us can become more objective in our thinking on any subject.\(^7\) At this point someone might ask how logic is related to philosophy—it is often rumored that there is some connection between the two. Philosophy, as the word was coined by the ancient Greeks, means "pursuit of wisdom." Wisdom could be understood as a knowledge of objective truth and how it is to be applied in living a happy and good life. The concept of "pursuit" employed means that one cannot know objective truth by sitting on one's hands—one has to learn and use the skills of objectivity. Thus, philosophy, to use more modern and less metaphorical language, is the action of making the goals and skills of objective methodology the ideals for conducting the relevant parts of one's intellectual life. A philosopher is one who tries to think according to the ideals of objectivity in regard to all questions and issues that arise in life. No one achieves this ideal in a perfect sense; but perhaps the basic point is that it is important to make the effort.

Logic is the fundamental academic discipline, basic to any academic subject which proposes to use an objective method. Since philosophy is the love or pursuit of objectivity (logic) wisely and appropriately employed, that is probably why in objective disciplines the most advanced academic degrees, awarded to persons who have shown they can independently conduct research (use objective methods), are known as Philosophiae Doctor. This Latin phrase, abbreviated Ph.D., means "one who is a teacher of objectivity." While we are using a little Latin, it would be helpful to add that another term, scientia (in English, science) is the Latin name for a concept for which philosophia is the Greek name.
THE STRUCTURE OF ARGUMENTS,
AND ALPHA EXISTENTIAL GRAPHS

Let us return in imagination to the point at which in our thought life a
doubt has occurred, and we have resolved to try to settle it by means of an
objective method. We further imagine that there are just two persons
present. For a concrete case, suppose our doubt can be expressed as “Is
semiotic a science?” In effect, the “yes” and “no” answers to this ques-
tion comprise the two conflicting beliefs in the doubt. Since we are objec-
tivists, we now seek evidence which if true would tend to show that one
of these two beliefs is true. As we are thinking about this, suppose that
one of us has a creative inspiration, and states, “Maybe it isn’t a science,
because it doesn’t seem to make predictions, and if something is a science,
it can make predictions.”

The person who made that statement might go
on to say that the evidence or reasons mentioned are true (they at least
seem to be true), and furthermore, that if true, it seems that these reasons
are related to “It isn’t a science” in such a way that these reasons being
true make this sentence true (or, this sentence’s truth follows from the
truth of the reasons). In the traditional terminology of logic, the reasons
are called premisses (not premises, a word that means “a place”), and that
for which they are reasons is the conclusion. The person who had these
ideas is in effect making two claims or assertions: (1) that the premisses
are true, and (2) that the premisses are related to the conclusion such that
if the former are true, the latter must also be true. The person who pre-

tsents these ideas and these claims we shall call the argument Presenter.

Some other person, for convenience labelled the argument Evaluator,
must understand that these sentences and these claims about them have
been presented. Moreover, these two claims must be evaluated. That is,
from our original question (the doubt) we now have two new questions
to ponder—the two claims made by the argument presenter. As objectiv-
ists, we will naturally select the objective method for resolving these new
doubts. For the moment we set aside the doubt associated with the first
claim, and for a bit we shall assume that the premisses are true in order
to focus on trying to settle the second doubt (namely, is the structure or
the relationships or the form of the argument advanced such that if the
premisses were assumed to be true, the conclusion must also be true?).

Peirce’s logic of Existential Graphs is a way of objectively testing
claims like this second one. We are now in position to begin to develop
the Alpha or first part of EG. We want to explore this system in detail in order to see, by first hand experience, that there really are techniques readily available whereby we can objectively discern whether an argument’s conclusion is supported by its evidence (its premisses) as opposed to the erroneous contention that all arguments can only be assessed subjectively or arbitrarily or egotistically. The advantages of EG for logic are its surprising power and ease of use because of its pictorial or graphic manner of representation.

The system is composed of a series of agreements between its users. Some of these agreements involve adoption of common terms in order to facilitate our communication. Other agreements concern the use of rules for transforming graphs from one state into another state. The system as a whole has the character of being truth-preserving. That means that its terminology and rule set is such that by following them, we would never make a transformation from a condition of truth to a condition of falsity. By following the terminology and rules carefully, we are guaranteed that every transformation permitted in the system will be truth-preserving.

Because we intend to be objective, we cannot accept the set of terms, and rules for EG through any other method than objectivity. That is, we wish to have an objective system for analyzing arguments, so we must use objective procedures in establishing and confirming a system of rules and terms for that purpose. To begin that process, we first note that EG is concerned with assertions. An ASSERTION occurs when a person claims that a particular statement is true and indeed accepts responsibility for that statement’s truth. However, just because someone asserts a sentence as true does not automatically mean to you that it is really true. From your standpoint, even if you agree that the asserter is generally a dependable person, the assertion is something that might be true. Because we want to record assertions, we will need a convenient method for doing so. We shall imagine that any piece of paper, or other surface, on which EG assertions are written, is an instance of the SHEET OF ASSERTION. Any declarative sentence written on the Sheet of Assertion is agreed among us to have been asserted by the argument presenter. Thus if we use single letters to stand for simple declarative sentences, writing that letter on the Sheet of Assertion constitutes its being asserted by the writer. This is another agreement. In terms of it, if I let P stand for “Petroleum is scarce” and wrote P on this sheet of paper (which I would be using as a Sheet of Assertion), you would understand that I had just asserted P. You would agree that P isn’t true because I asserted it (that would be an example of following a nonobjective method, perhaps the method of respect), but still
you would probably think that P has some chance of being true, such that you would think to yourself that P might be true. Hence we see that any assertion written on the Sheet of Assertion has the status "might be true," or "assumed for the moment to be true."

Now what would you understand if I wrote two sentences, or letters standing for sentences, on the Sheet of Assertion? Suppose I have a second sentence "Quicksilver is rare" which I abbreviate with the letter Q and now I write P Q on the sheet. How are we to understand that? One need only use simple common sense to see that this would mean that I had asserted both P and Q. It would not make any difference to the assertions if I were to write them as Q P, for I have still asserted each of the two sentences, P and Q. Thus, writing two or more sentences on the Sheet has the force of asserting both, as if they had been joined with the word "and," as such joint assertions usually are expressed in everyday speech.

Often as we are talking about assertions, we have need of a kind of negative version of assertion, what is called DENIAL. If I want to do the opposite of asserting the sentence that P represents, I will want to deny P. Here I will be assuming responsibility for it really being the case that P is false. We shall need a way to indicate denials, and it will be to enclose P in a more-or-less circular area indicated by a line which we shall call a CUT (or alternatively a LEVEL). So, if I wanted to deny P, I would write

\[ \text{P} \]

This is understood by you then to mean that P might be false. Think of this as a P written on a hockey puck or poker chip which is lying on the Sheet of Assertion. Thus, think of a cut or level as having some thickness. I can say that two or more things are separately denied by simply enclosing each thing I wish to deny within cuts. If I wanted to deny P and to deny Q, that would be

\[ \text{P} \quad \text{Q} \]

This means "'deny P' and 'deny Q.'" Sometimes I want to deny a compounded sentence, for example the sentence "P and Q." That would look like

\[ \text{P} \quad \text{Q} \]
This means "deny 'P and Q.'" I could even "deny 'P and the denial of Q,'" which would be written on the Sheet of Assertion as

\[ P \quad Q \]

The order of writing letters or other symbols within cuts makes no difference. That is,

\[ Q \quad P \]

is the same as

\[ P \quad Q \]

One simple kind of graph is of particular interest. Consider this assertion: "P and the 'denial of P.'" Such a sentence would mean that I had both asserted P and denied P. In our system we shall agree that any sentence asserted is either true or false, but not both. So, "P and the 'denial of P'" would not ever be true in the system of Existential Graphs. It would be necessarily false. That means that its denial, "I deny 'P and the denial of P,'" would be a sentence that would necessarily always be true in our system, no matter what sentence were to be substituted for P. In graphic expressions, "P and the 'denial of P'" is written

\[ P \quad P \]

"I deny 'P and the denial of P'" is written as

\[ P \quad P \]
This means that

\[ \begin{array}{c}
  \text{P} \quad \text{P} \\
  \text{X} \quad \text{X}
\end{array} \]

or

any assertion \quad \text{same assertion}

will be true no matter where or when written.\(^{11}\)

We can now state RULE ONE of the system: it is called Double Cut (we shall abbreviate the name of this rule as DC). A double cut may be removed from under, or put under, any graph. This follows easily from the nature of denial. If I deny a statement, and then deny that statement again, that is the same as asserting it (and vice versa). Let us see how this would look in everyday speech. Suppose I assert (1) "Petroleum is scarce" but then later on change my mind and instead of wanting to place the force of my reputation behind urging others that P is true, I now wish to be held responsible for P being false. I would then say (2) "I deny that 'Petroleum is scarce.'" If I changed my mind once more and denied this second statement, I would say (3) "I deny the denial that Petroleum is scarce." In graphs this sequence would be

(1) \quad \text{P} \\
(2) \quad \text{P} \\
(3) \quad \text{P}

It is easy to see that \quad \text{P} is the same as \quad \text{P} \\
and that the reverse is also correct: \quad \text{P} is the same as \quad \text{P}

This means that I can transform \quad \text{P}
into $P$

or $P$

into $P$

and never begin with something true and end with something false. Either of the two transformations allowed by Rule One is a truth-preserving transformation because a double denial of an assertion is equivalent to that assertion.

What is considered to be a graph? Any single letter is a graph, as is any single cut. Any stack of cuts would be a graph. A stack of cuts in which a higher level one overhangs a lower one is not permitted, hence is not a graph. Letters may be written on cuts, as long as there is no overlap of letters and no higher level cut covers a letter written on a lower level. The rules often refer to graphs. As long as one is unambiguous as to what the word "graph" refers within an instance of rule use, it can have a wide reference. For instance consider that the following complex as a whole is a graph.

It is resting on level two. In general, a cut is considered to rest on the level which the imaginary bottom of the cut resides. But within the above complex, I might, if I wanted to use the rule DC, consider that DC would be applied to the graph $P$. Or, some other rule might permit me to an operation on just $Q$. As long as we are clear as to what complex of marks we regard as a graph within the context of a particular rule use, we will have this latitude.

In using DC it is helpful to keep the following physical model in mind. First, remember that a double cut pattern is like a mesa on a high shelf. A graph of some sort (perhaps just a piece of blank Sheet of Assertion, perhaps a letter or letters, or perhaps a complex combination of letters and cuts) rests on the mesa, and the shelf is completely empty (has no graphs on its surface). Imagine the use of DC to involve holding the graph on the mesa with one hand while pulling out the mesa and shelf with the other, and then letting the graph held fall to whatever level there is left for it to rest upon. The reverse form of DC would involve picking up a graph,
sliding the mesa/shelf double cut under it, then placing the lifted graph to rest on the mesa top surface.

Because we will often be wondering if a certain graph can be transformed into another graph according to the rules, we shall need a method of indicating that such a question is under consideration. This can easily be done by writing the INITIAL GRAPH at the left of a question mark, and the graph which is the goal of the proposed transformation to the right of that mark. For instance, suppose you presented me with this problem: Can

\[
P \odot Q
\]

be transformed into

\[
P \quad Q
\]

by means of the rules of EG? I would state this as a question or problem on the Sheet of Assertion by writing

\[
P \odot Q \quad ? \quad P \quad Q
\]
The question mark also indicates that we are trying to find out if this transformation is a truth-preserving one (the second claim of an argument presenter, remember?). When we examine a stated problem like this one, we try to find a way to transform the graph at the left of the line, using only the rules of EG, so that a new graph may be written under the first graph on the left, hoping eventually by continued application of the rules to achieve a graph that is exactly like the one at the right of the question mark. The graph on the right is called the GOAL GRAPH—we never try to transform it. The function of the goal graph is to show us what the end transformation should be like. We only perform transformations on the graph to the left of the question mark, and for the sake of convenience, we place each successive transformation below that initial graph. Each time a transformation is made, we also make notes about what allows each transformation. We do that to be objective—to allow fellow logicians to follow and check our reasoning.

Now let’s try to answer the question, can

be transformed into

in a truth-preserving way? Here is an answer.

1. 

2.  

Notice that since the transformation was accomplished by means of DC, the overall transformation will be truth-preserving. When an initial graph can be transformed by means of the EG rules into a stated goal, the question mark can be crossed out because there is no longer any question. “But,” you might say, “suppose we don’t agree about the correctness of the steps in the transformation.” If that were to happen, we could not remove the question mark because we would not have agreed upon the derivation. The system of Existential Graphs, however, makes all steps of the transformation to be either writing something or erasing something from the Sheet of Assertion. These kinds of steps (writing or erasing a mark) moreover are under the control of objectively developed rules (we are now developing such a set of rules). This means that we will be able, as a group of objective students of logic, to see each step clearly, because
each step will be very small, and thus evident to a careful objective observer. "Well," you might ask further, "suppose some nonobjective person disagreed with our transformation solution." The answer is that logic is only for objective persons. Persons who refuse to be objective cannot be logicians (nor semioticians). Of course, none of us is perfectly objective all the time. But it is also true that some persons try to be objective, whereas other persons don't try.

We can now introduce and confirm RULE TWO, which is called Erasure (abbreviated as E): *Any graph that is on an even level may be erased.* In order to use this rule (and others as well) we need to reach an agreement about the notion of numbering a level. First of all, we shall consider that the Sheet of Assertion, on which we write all our graphs ultimately, is to be understood as level two, an even level. Furthermore, there are no levels below two, although there are an infinity of possible levels greater than two. The third level would be the level of the first cut resting on the Sheet of Assertion. For instance, the denial of \( P \) is represented by writing \( P \) on a third level cut. Think of cuts as single or concentric hockey pucks stacked upon each other so that they never overlap or overhang, and drawn as if viewed from above. That should help you visualize levels very easily. To confirm rule two, let us break it into two parts—one part for level two cases, and another part for cases of all higher even levels.

Imagine that we have two graphs written on level two as in the example below. The question is: can one of them be erased, and if so is the resulting transformation truth-preserving?

\[
P \quad Q \quad ? \quad P
\]

In order to confirm this, we shall write it out in English.

\[
P \quad \text{and} \quad (\text{deny } Q) \quad ? \quad P
\]

We can check that this is a truth-preserving transformation by trying to assume that it is not, and then tracing the implications or consequences of that assumption. If the assumption produces contradictory consequences, then the assumption that the transformation is not truth-preserving must not be correct, and thus it must be a truth-preserving rule. To assume that the above transformation is not truth-preserving would be to assume that the initial graph is true while the goal is false, or:
For "P and deny Q" to be true, both "P" and "deny Q" must be true. But we have already assigned, in our assumption, "P" to be false in the goal. Hence assuming the initial graph true and the goal graph false has led us to the contradictory consequence that "P" is both true and false. This cannot be, therefore it is not the case that this transformation is not truth-preserving. Hence, this transformation is truth-preserving. This would be the case no matter what graphs are written on level two—any one of them can be erased. Such a transformation will always be a truth-preserving process.

Next consider the case of erasure on even levels greater than two. Here is a representative case:

\[
\begin{array}{ccc}
P & Q & R \\
\end{array}
\quad ? 
\begin{array}{c}
P Q \\
\end{array}
\]

Expressed in English this would be:

deny (P and deny (Q and R)) ? deny (P and deny (Q))

Again let us assume that this is not truth-preserving, an assumption which would show up as follows:

\[
\begin{array}{ccc}
T & F \\
\end{array}
\quad ? 
\begin{array}{ccc}
deny (P and deny (Q and R)) & ? & deny (P and deny (Q)) \\
\end{array}
\]

Let us focus attention on the goal graph. Compound "and" statements are true only when both conjuncts are true. And if the denial of an "and" compound statement is false, that means that the "and" statement as a whole is true, which further means that each part of the "and" statement is also true. We list these results for the goal graph, including the result that Q must be false (its denial had to be true, remember).

\[
\begin{array}{ccc}
F & T & T & F \\
\end{array}
\quad ? 
\begin{array}{ccc}
deny (P and deny (Q)) & T \\
\end{array}
\]

Now we write T or F for the letters in the initial graph to match those just developed in the goal graph.
\[ T \\
\text{deny} \ (P \ \text{and deny} \ (Q \ \text{and R})) \quad ? \]
\[ T \quad F \]

Within this statement, because \( Q \) is \( F \), \((Q \ \text{and R})\) must be \( F \) too. This is the case because if either part of an "and" statement is false, the entire statement as a whole is false. We now have:

\[ T \\
\text{deny} \ (P \ \text{and deny} \ (Q \ \text{and R})) \quad ? \]
\[ T \quad T \quad F \quad F \]

Now we see that a contradiction has been reached, because \( P \) is \( T \) and "deny \((Q \ \text{and R})\)" is \( T \), which means that "\((P \ \text{and deny} \ (Q \ \text{and R}))\)" is \( T \). Yet this is a contradiction in conflict with our original assumption that the entire initial graph must be true—it would be false if "\((P \ \text{and deny} \ (Q \ \text{and R}))\)" were true. This means that this transformation is not nontruth-preserving, or that it is a truth-preserving transformation (it is a transformation that will never lead us from a true initial graph to a false goal graph). Both cases, that of level two, and that of level four, are representative of numerous other kinds of cases. Moreover, the confirmation procedure could be used over and over again to show that erasure is a sound rule that works on any even level. Does this seem lacking in rigor for some of you? Remember we are pretending to be beginners. More rigor can be found in Roberts (1973, see appendix 4) in which the EG rule set is shown to be complete and consistent.

In using the rule of erasure, remember that if a cut is erased from an even level, anything on that erased cut is removed and discarded as well. This is a significant difference between erasure and double cut (in DC a graph was retained—no retention occurs in E).

RULE THREE in the system, known as Deiteration (abbreviated as DE), is stated as follows: *Within any continuous single level, the same graph that appears more than once may have all except one instance removed; and, for the same graph that appears on both a lower and a higher level, the higher level instance may be removed (provided no valleys are crossed).* In confirming this rule, it is convenient to break it into its two parts. The first part is correct because within any given level, multiple occurrences of any particular assertion are equivalent to just one instance of that assertion. We can see that this is true by reflecting on common kinds of experiences about assertions. For instance, if each person in a large crowd asserted "Petroleum is scarce," we would have a number of instances of the same assertion. We could reduce that to one assertion of
the same sentence. Looking at this from the standpoint of truth preservation, we can see that \( P \) is always going to be true when "\( P \) and \( P \)" is true; thus we could never pass from \( P \) true to "\( P \) and \( P \)" false, nor could we pass from "\( P \) and \( P \)" true to \( P \) false. This means that \( P \) is logically equivalent to "\( P \) and \( P \)" (or to "\( P \) and \( P \) and \( P \) and \ldots "). Thus when "\( P \) and \( P \)" (or "\( P \) and \( P \) and \( P \) and \ldots ") is found within a particular continuous level, we may reduce that to just \( P \) if we wish, by means of this rule.

The second half of this rule must be confirmed by means of the truth-preservation test we have used earlier. Consider this transformation that the rule’s second half would allow:

\[
\begin{array}{ccc}
P & P & R \\
? & P & \text{R}
\end{array}
\]

In English, this would read as:

\[ P \text{ and deny } (P \text{ and } R) \quad ? \quad P \text{ and deny } (R) \]

As before, we now assume that the initial graph is true and the goal graph is false, then check the consequences of that assumption to see if contradictions are found. To begin, our assumption yields:

\[
\begin{array}{ccc}
T & \text{F} \\
P \text{ and deny } (P \text{ and } R) & ? & P \text{ and deny } (R)
\end{array}
\]

For the initial graph to be true as a whole, the two members of the main conjunction must each be true. This yields:

\[
\begin{array}{ccc}
T & \text{F} \\
P \text{ and deny } (P \text{ and } R) & ? & T \end{array}
\]

We now record that \( P \) is true in the goal graph.

\[
\begin{array}{ccc}
\text{F} & \text{?} & P \text{ and deny } (R) \\
\text{T} & \end{array}
\]
This means that if \( "P \text{ and deny (R)}" \) is to be false as a whole, \( "\text{deny (R)}" \) will have to be false, which makes \( R \) true in the goal graph. We now transfer this finding for \( R \) to the initial graph, and have:

\[
\begin{array}{c}
T \\
\text{P and deny (P and R)} \\
T \\
T \\
T
\end{array}
\]

For \( "\text{deny (P and R)}" \) to be true as needed, we must make \( "(P \text{ and R})" \) false. But with \( R \) now known as true, we can only do that by making \( P \) false, but we have already found \( P \) to be true, hence we have reached a contradiction, which shows that this transformation cannot fail to be truth-preserving. We can easily repeat this verification procedure for any higher level. Therefore, the general form of the rule is truth-preserving.

"But what is this talk about valleys in the Deiteration rule?" you ask astutely. Here is an example of a valley.

Here we see that in the initial graph the \( P \) at the left is on level four, and there is another \( P \) on the right at level five. In a minimal sense, the \( P \) on the right is on a higher level than the \( P \) on the left, so one might be tempted to Deiterate the right-hand \( P \). But this cannot be done because of the warning about valleys. You can imagine the valley if you recall our analogy for visualizing cuts or levels—a stack of concentric hockey pucks. To go from the left \( P \) to the right \( P \) in the example one would have to "cross a valley." See how that would work in this side view of our hockey puck stack:

\[\nabla = \text{valley}\]
Now consider this side view of the example we confirmed above—notice how there are no valleys, but instead only “advances up a mountain.”

If we test an example of Deiteration that had valleys involved, we would find out that the inclusion of a valley allows for failure of truth preservation. Here is an English account of the above valley example with marks assigned that shows how it can fail to preserve truth (how it can have a true initial graph and a false goal graph without contradictions being present).

\[
\begin{array}{cccccccc}
T & F & F & F & T & T & T & T \\
\text{deny (deny P & deny (R & deny (P & S)))} & \text{deny (deny P & deny (R & deny S))} \\
T & F & T & T & T & F & T & T
\end{array}
\]

The FOURTH RULE is something like the inverse of the third one. This rule, called Iteration (abbreviated IT) states: \text{Within any continuous single level, a graph may be repeated again; and, a graph appearing on a lower level may be repeated at a higher level, provided no valleys are crossed.}

The first half of Iteration follows from what we said about the first half of Deiteration. Because P is equivalent to “P and P,” whenever we have a P on a given level, we may substitute its equivalent, namely “P and P.” Thus, the reasoning for the first part of Iteration also justifies this kind of transformation.

The second half of Iteration can be confirmed by means of previously established rules or agreements. We have established that the denial of “P and deny P” is always true, no matter where written. Thus it will always be a truth-preserving transformation to write this particular graph onto
any level one wishes. That fact will enable us to confirm Iteration, part two. Consider this statement of the problem:

1. P R S ? P R P S

For our first step, we put

P P

into the fourth level cut alongside S. This yields:

2. P R P P S 1, necessarily true

The left hand P can now be Deiterated as follows:

3. P R P S 2, DE

There is now a double cut around the remaining P, which can be removed:

4. P R P S 3, DC

Step four is the same as the goal graph, which means that we have confirmed that the transformation posed as questionable in the statement of the problem is no longer questionable, but is truth-preserving. This strategy of confirmation can be used on various levels, and we find that Iteration is correct, in general, limited only by the exception of valleys (as in the case of Deiteration). Iteration is a word that means “repeat,” thus Deiteration means to “unrepeat.” It should be kept in mind that Iteration allows the making of duplicates, and that which is duplicated remains until legitimately removed.

Our FIFTH RULE, and the final one, is called Insertion (abbreviated IN). It states: A graph of your own choosing may be placed upon any odd numbered level. Here is a typical transformation using Insertion:

1. P ? P S
To confirm that this will work, we will place

onto the third level alongside P. We can do that because any assertion of that form is necessarily true on each and every level of our system. And it is true no matter what letter or other graph is used in the interior of the assertion. For example, all these graphs are necessarily true.

So, in the problem stated above, into the third level we will place

to yield:

2.  

Now the left hand S is on level four, and thus may be erased (by E):

3.  

We are left with a double cut which may be removed.

4.  

3, DC
This gives us the desired confirmation of this transformation. You can easily see that this could be generalized correctly to apply to any odd level whatsoever.

In using insertion, avoid lifting up any graphs written on an odd level to place a cut under them by a presumed permission of IN. To do so is not allowed by the rule, and produces nontruth-preserving transformations. Perhaps a good physical model for use of IN is to think of a preparation area located somewhere other than the Sheet of Assertion. On the preparation area, you may make up any graph you wish, then in the Sheet of Assertion place that graph onto an odd level area that is not occupied—in so doing you may not cover up any graph already on the odd area, nor may you lift up any graph on the odd area.

We are now in possession of objective confirmation\(^\text{13}\) of all five rules, and along the way we have also acquired a method of confirming, by means of simple techniques, various kinds of problems presented to us. The fact that EG has only five rules, each of which is easy to remember, is a considerable advantage over comparable systems that have a dozen or more rules. Moreover, EG has the further advantage of being very pictorial. This is a big help because our sight is our major sense, and a lot of our reasoning is done with the aid of input from sight. We even say, when we understand something, "Oh, I see it now!"\(^\text{14}\).

In order to refresh your memory about the rules and to give some further practice, let's run through a few more basic problems. These transformations are not themselves regarded as rules, but they are so basic that they occur many times. Of course, any transformation confirmed by the basic rules will itself be a dependable transformation, and could be regarded as a rule if one desired it. Yet it is an advantage to have a smaller set of rules simply for the sake of memory.

This transformation is known as Modus Ponens.

1. \(P \land P \rightarrow Q\)  \(\Rightarrow\ Q\)

2. \(P \land Q\)  \(\Rightarrow\ 1, \text{DE}\)

3. \(Q\)  \(\Rightarrow\ 2, \text{E}\)

4. \(Q\)  \(\Rightarrow\ 3, \text{DC}\)
This transformation is known as Hypothetical Syllogism.

1. \( P \quad Q \quad Q \quad R \quad ? \quad P \quad R \)

2. \( P \quad Q \quad Q \quad R \quad \)

3. \( P \quad Q \quad R \quad \)

4. \( P \quad R \quad \)

5. \( P \quad R \quad \)

In this third example, we introduce a new convention which will make life easier in working longer problems. Instead of redrawing

\( Q \quad R \quad \)

each time, we simply draw a vertical line downward through the demonstration to represent that

\( Q \quad R \quad \)

is still on the sheet of assertion. That graph is finally erased totally in step 6.

In order to use EG to test arguments expressed in English, we need to be able to translate common English compound sentence forms into EG graphs. So, let us consider some typical cases. First, compound statements in which “and” is the connecting word will be easy to work out. “A and B” is simply \( A \quad B \).
"(Not A) and B" would be

![Diagram of A \(\land\) B]

"A and (not B)" becomes

![Diagram of A \(\land\) \(\neg\) B]

"Not (A and B)" is

![Diagram of \(\neg\) (A \(\land\) B)]

"If A then B" is another common compound sentence form. It can be expressed in EG if we consider the following matters. We know that "If A then B" is false as a whole if we know that A is true and B is false. To say that "A is true and B is false" in EG would be written as

![Diagram of A \(\land\) \(\neg\) B]

This is definitely the overall false instance of "If A then B." Thus the opposite of this instance will be all the cases that are overall true (ones that are not cases of starting with A true and ending with B false). This means that the opposite, or the denial, of "A true and B false" is the truth-functional meaning of the overall truth of "If A then B." In EG, we would write this opposite as "Deny (A and deny B)", or

![Diagram of A \(\land\) \(\neg\) \(\neg\) B]

Thus we have the EG way of writing "If A then B."

Another common English statement form is "A or B." We know that this statement is false as a whole if A is false and B is false. "A is false and B is false" is written in EG as

![Diagram of \(\neg\) A \(\lor\) \(\neg\) B]

All other cases of truth or falsity patterns for "A or B" yield the result that the whole statement is true. That means that the opposite of "A is
false and B is false" states all the true cases. This opposite is "Deny (A is false and B is false)" which in EG is written as

Thus, "A or B" in EG is

"A equivalent to B" means that A and B have the same truth qualities. This will occur if it is true that "A implies B, and B implies A." "A implies B" is

in EG, and "B implies A" in EG is

"A implies B, and B implies A" is simply both the preceding written on the sheet of assertion, or

Now that we can write English sentences into EG, we can use EG to test arguments, or to establish equivalences. To establish an equivalence, we must show that each equivalence member can be transformed into the other through EG rules. That is, if the question is, Is X equivalent to Y?, we can answer in the affirmative if we can, through EG, transform X into Y, and also transform Y into X.

To find out if a truth-functional argument is valid, we write the premisses as the initial graph and the conclusion as the goal graph. If the goal graph can be reached through transformations from the initial graph, then the argument is truth-preserving or valid. Once an argument has been checked by means of such a transformation, any other argument having that form will be valid too.
To say that an argument is valid is to give a "yes" answer to the second claim of an argument Presenter, to call us back to our original problem. That is, we had created an argument in response to a doubt concerning whether semiotic was a science. The imagined argument was:

1. If semiotic is a science, then it can make predictions.
2. Semiotic doesn't make predictions.
3. Therefore, it is not the case that semiotic is a science.

The first claim of an argument presenter is that the premises are true (which would probably be wrong in this case, for the second premiss is false). The second claim is that the argument's structure is such that if the premises were true, the conclusion must also be true. The second claim in this case is true, and can be objectively shown to be so, thus:

1. \( S \) \( P \) \( P \) \( S \)
2. \( S \) \( P \) \( 1, \text{DE of } P \)
3. \( S \) \( P \) \( 2, \text{E of } P \)

EPILOGUE

Now we have laid out the background for EG and a sufficiently large part of it in order to talk about its properties and qualities. What can be learned from it? Briefly I want to advance some hypotheses, which if not true, will I think at least be fruitful in taking our research further. It seems to me that courses that present semiotic urgently need a fairly simple example of the subject matter. Most, if not all, of the examples I have seen either omit or de-emphasize the process aspect or the objective aspect of semiosis. If such is the case, then would not EG be at least one very effective example of semiosis for pedagogical purposes? If it were so used, it seems to me that it would provide a way in which an instructor could discuss abstract realities which objectively possess the characters they have independently of anyone's wishes or desires as to what those properties might be. In other words, are we not often accused of being too abstract, too subjective, too wordy? EG gives us a way to combat this popular misunderstanding. The misunderstanding is that since we do not deal with existing realities, we do not deal with any realities at all. Actually, we deal with the most real realities, those objective relationships or structures which do not exist, but without which logic and much else would be impossible.
These seem to me to be weighty reasons for learning and using EG, the portable, pocket semiotic lab.

* * *

Now you should look back at the marks which introduced our experiment. Do you see them differently now? Do they have meaning for you which they previously lacked? If so, I suggest that you are in the power of their real semiosis potential, which missed you before (naturally).

Can you solve the problem stated at the beginning of that experiment? If you did solve it and would like to know if your solution is correct, please ask the author.

NOTES

1. Peirce admired the Gospel of John, perhaps in part because it dramatizes a struggle between seminarian minds and laboratorian minds—"theologians" (egoentristes) and "objectivists." The epithet quoted was directed by "the Pharisees" at an ordinary man (socially, perhaps even subordinary) who had just experienced a surprising cure of his blindness. But this epithet could have been directed at Galileo, or Copernicus, or Peirce, by persons who were not scientific intelligences (persons unable to learn from experience).

The "laboratory intelligence" theme in Peirce is absolutely essential for understanding any aspect of his philosophy. The best contemporary discussions of it at present are to be found in Eisele (1979) and Esposito (1980). For Peirce's own discussion of the theme, one might begin with the following (note two gives an account of the reference technique used here): P 1078 What Pragmatism Is, Monist 1905 (in CP6); MS 940 Logic of Events [called "The Backward State of Metaphysics" in CP, see 6.1-5 which is about half of the MS], 1898; MS L67 [Letter to Signor Calderoni, the first half only is printed at CP 8.165 f.—see the important second half in MS], 1905; P 1128 Prolegomena to an Apology for Pragmatism, Monist 1906; P 988 review of The Principles of Logic by H. A. Aikins [in Ketner and Cook (1975-1979), part 3] 1902; MS L75, Application to the Carnegie Institution [excerpts in Eisele (1976), vol. 4, but see the entire MS], 1902.

Toward the end of his career, Peirce regarded Logic as Semiotic—for an important discussion of this point see Fisch in S 492, Peirce's General Theory of Signs.

2. P 26 refers to the standard numbering system in Comprehensive Bibliography, while MS 298, ISP 13 refers to the numbering of Robin's Catalogue for Peirce's manuscripts, amended with a sheet number based on the order established at the Institute for Studies in Pragmatism. References to secondary studies of Peirce (to 1977) will use the numbering system of Comprehensive Bibliography to save effort and space (for example, S 1166 is Rescher's Many-Valued Logic). The letters CP followed by a number for volume, a period, followed by a second number for paragraph, is the standard reference scheme for Hartshorne, Weiss, and Burks, eds., The Collected Papers. In the past few years, there have been tremendous strides in the tools of Peirce scholarship. For a guide to these developments, see Fisch, Ketner,
and Kloesel (1979). It is time to state here that the notes for this essay will attempt to suggest leads from the central line of thought into specific areas of Peirce’s thought, hoping that the exemplifying function of EG-in-action can be enhanced. If EG is the Best Example, then with it we should also be able to show how it illuminates and exemplifies some major themes of Peirce’s thought. I will use notes primarily for this function.

3. That there is nothing in the cosmos requiring us to be rational is a principle parallel to the so-called anti-theism of the early Sartre, so it seems to me. That is, if we understand his talk of choice, for example, in Sartre (1957), as meaning the same thing as interpretation, then his objection to theism, with its heavenly requirements and preordained standards, is an objection to claims that the universe requires us to be reasonable, or that there is intuitive knowledge in the sense of Peirce P 26. Thus, Sartre would not, perhaps, have been especially opposed to every aspect of theism, but to the logical principles it commits one to incorporating. These would be theological or seminarian attitudes, in Peirce’s terminology.

4. On this point see P 1166 A Neglected Argument for the Reality of God, Monist 1908; other aspects of this article are relevant to the present essay.

5. Peirce often used words like “destiny” or “fate” in special technical senses to describe the phenomenon of “being brought to an agreement.” See, for examples, MSS 360–396 Logic [called The Logic of 1873 in CP 7.313–361—but see the whole MS sequence because serious omissions occur in CP], 1873; see also Ransdell’s excellent discussion of this and other related themes in S 1142–1150.

6. Perhaps Peirce’s philosophy as a whole could be described as a unified theory of objective method. Objective Method, not semiotic, or logic, or the categories, is the fundament for Peirce. One finds clues to this in many places. Perhaps one of the most explicit is cited by Eisele (1979), p. 13. For Peirce, we might say, in the beginning was method, and all else follows from that. Since Peirce was nurtured in a laboratory (a natural scientific and a mathematical laboratory—remember his father’s intense teachings), naturally the method is that of science (in a general sense, as discussed here under the heading of objectivity). Moreover, Peirce sees scientific method as a living activity, not simply as a recipe: for example, see P 779, The Century’s Great Men in Science, 1901.

It is clear that semiotic, as a science, must proceed in an objective way. Hence in order to understand what might be the Best Example of semiosis for Peirce, it is important that we be well grounded in his conception of the general method of science.

Some important elements of objective methods are often discussed by Peirce under the heading of Critical Common-Sensism. For an account of that topic, see Ketner (1972).


8. Beginning logic students sometimes ask “Where do arguments come from?” In this example, and in thinking up strategies for demonstrating a problem in EG, I think Peirce’s answer would be that it is an abduction. That is, we make a guess, a hypothesis, which we then later check for correctness by way of an objective technique. On Peirce’s abduction, see Sebeok and Umiker–Sebeok [with an introduction by, and with the assistance of Max H. Fisch] (1980) and S 435 Fann, Peirce’s Theory of Abduction.
One often finds guesses within egocentric methods, but the hallmark of such an occurrence there is that the guess is often seen as an end in itself, whereas in science it is just a starting place.  

9. Argument Presenter and Evaluator (sometimes called Graphist and Interpreter, or similar names by Peirce—see Roberts, 1973) are important in the Best Example. These can be separate persons, the Presenter and Evaluator as in my account, or two separate groups of persons collectively functioning as such, or just one person now functioning as Presenter, later functioning as Evaluator. It would be Peircean style here to say Quasi-Presenter or Quasi-Evaluator, to mean Functioning-as-Presenter (as if a Presenter, in regard to function). The functions and relations between functions are the important parts. The Presenter, Evaluator, and the Graph(s) comprise the problem and constitute a community of objective inquirers. This community is a difficult factor to express in an account such as this, but, dear Reader, please help with your imagination. In a classroom setting, the instructor can function as argument Presenter, with the students acting as Evaluators of the Graph present, all persons present being slowly drawn objectively to agree. Thus, you see (I hope), that EG is built upon the fundament of objective dialogic thought processes (SEMIOSIS!). Thus, EG in action is a virtual laboratory for learning the living skill of undertaking that kind of process.

I should add at this point that Roberts' book on EG is an absolutely essential introduction to the topic, and should be read by persons wanting to pursue this matter. My aim has been to provide an approach to the graphs for a general audience, whereas Roberts addresses expert logicians. I have adopted the general form of rules Roberts employed, and I have benefited from discussions with him on this and other topics. I am also grateful for several discussions with Professor Alberto Cortes-Osirio of Bogota, Columbia. Moreover, Roberts' book is an important guide to themes relevant to the graphs within the entire Peircean corpus.

The Graphist/Interpreter or Presenter/Evaluator aspect of EG makes it clear that it is dialogic in nature, or of the nature of semiosis. On this and related points see MSS 396, ISP 6 and 7 followed by 380, ISP 2-5; 381, ISP 2-14; 389, ISP 2-14; 388, ISP 2-4. This is the chapter on Signs from the so-called Logic of 1873. It is important to note that this discussion of semiosis occurs in a book about Logic, "the doctrine of truth, its nature and the manner in which it is to be discovered" (MS 364, ISP 7).

10. Notice that here we are going to be faced with a doubt within logic in the narrow sense, in that we shall wonder if something proposed as a rule for logic is correct. How shall we answer that doubt? As objectivitists we can use no other method than an objective one. But what other objective method?—not logic proper, for that would be circular. Peirce's answer was that we should use mathematical method to resolve logical doubts. He often stated that it was his business to treat philosophical problems mathematically, thus to produce an Exact Philosophy [see Eisele (1979), p. 277]. Thus, here Peirce would solve the doubt about a rule for logic by means of mathematical method. Now that means a diagrammatic method, for the method of treating a problem mathematically is "constructing some sort of diagram representing that which is supposed to be open to the observation of every scientific intelligence [an intelligence capable of learning from experience]..." Eisele (1979). With such a
diagram, one performs experimental transformations using small steps. The conclusion reached is then generalized (freed of all accidental properties). Again, in the spirit of a unified theory of objective method, we see Peirce performing experiments and observations in mathematics (and certainly with EG). This is yet another reason why EG might be the Best Example—not only is it a laboratory, it is a cheap one, needing only some scientific intelligences and marking materials. See also Roberts (1973, chapter 7), and Esposito’s brilliant discussion (1980, chapter 7, especially p. 227). Esposito provides a solid confirmation of my “cheap laboratory” remark by calling our attention to a passage in P 1128 [Esposito (1980), p. 228; also available at CP 4.531]. Compare P 160 note on the Theory of the Economy of Research, Report of the Superintendent of the US C&GS, 1879.

11. Notice that at this point, a necessary part of the effort of establishing a diagrammatic system is presentation of a careful terminology. All parties to the discussion resolve accurately to use agreed-upon terminology, and to avoid equivocal uses. Accidental equivocation will be the occasion to remember meanings established, or to work out a new agreement with a new technical word. This is a vital part of objective procedure, and in order to drive that point home, consider that non-objective methods often encourage terminological confusion. A good terminology does not come of itself—it must be worked out and enforced by scientific intelligences. Peirce did a great deal with this sort of problem—see Ketner (1981). At this point we can also see that the process of presenting and evaluating arguments is a fairly complex communicational activity.

12. Careful observation of the smallest possible steps, simple insertions or omissions, is what Peirce calls intuition in the mathematical sense—see Ketner and Cook (1978, p. 106 of part 2). This is not to be confused with intuition in the epistemic sense (“a premiss not also a conclusion,” see P 26). This is also not to be confused with present day mathematical intuitionism in the work of Brouwer and others (see Benacerraf and Putnam, 1964), although there seems to be some interesting points of comparison between Peirce and Brouwer.

Peirce had considerable contact with Victoria Lady Welby, who in turn influenced the Brouwer group in The Netherlands. It is significant that Peirce had sent a long account of EG to Welby, stressing its importance (see Hardwick, 1977).

13. Why use the word confirmation here, you might be asking. Because, we are dealing with mathematics which is an observational science (all objective method will involve observations). And observations are fallible. Peirce recommends not just fallibilism, but a contrite fallibilism—being humbly aware that there is no knowledge that is not open to the possibility that at some point in the future evidence might arise that will bring doubt. Moreover, we simply make errors: of procedure, of understanding, of oversight, of haste, and so on. Hence, mathematics is not a science that brings certainty if by this one means “devoid of a possibility of being false.” The certainty it brings is that of a well-confirmed belief.

14. Peirce was the first experimental psychologist in the United States—see Cadwallader S 227 and 228, and Cadwallader and Cadwallader S 230. It is especially interesting that in his psychological work Peirce studied the visual sense to a considerable extent.
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