“Few persons care to study logic, because everybody conceives himself to be proficient enough in the art of reasoning already. But I observe that this satisfaction is limited to one's own ratiocination and does not extend to that of other men.

We come to the full possession of our power of drawing inferences the last of all our faculties, for it is not so much a natural gift as a long and difficult art.”¹

Charles Sanders Peirce (1839—1914)

http://www.iep.utm.edu/peircebi/

C.S. Peirce was a scientist and philosopher best known as the earliest proponent of pragmatism. An influential thinker and polymath, Peirce is among the greatest of American minds. His thought was a seminal influence upon William James, his life long friend, and upon John Dewey, his one time student. James and Dewey went on to popularize pragmatism thereby achieving what Peirce’s inability to gain lasting academic employment prevented him from doing.

Pragmatism takes the meaning of a concept to depend upon its practical bearings. The upshot of this maxim is that a concept is meaningless if it has no practical or experiential effect on the way we conduct our lives or inquiries. Similarly, within Peirce’s theory of inquiry, the scientific method is the only means through which to fix belief, eradicate doubt and progress towards a final steady state of knowledge.

Although Peirce applied scientific principles to philosophy, his understanding and admiration of Kant also colored his work. Peirce was analytic and scientific, devoted to logical and scientific rigor, and an architectonic philosopher in the mold of Kant or Aristotle. His best-known theories, pragmatism and the account of inquiry, are both scientific and experimental but form part of a broad architectonic scheme. Long considered an eccentric figure whose contribution to pragmatism was to provide its name and whose importance was as an influence upon James and Dewey, Peirce’s significance in his own right is now largely accepted.

Peirce’s Works and Influence

During his lifetime, Peirce’s philosophy influenced, and took influence from, the work of William James. The two men were close friends and exchanged ideas for most of their adult lives. However, despite similarities and mutual influence, they strove hard to distinguish their own brand of pragmatism from each other’s. This is particularly so after James’ California Union Address where he attributed the discovery of the doctrine to Peirce and identified the early papers, “The Fixation of Belief” and “How to Make our Ideas Clear,” as the source of pragmatism. Peirce thought James too “nominalistic” in his pragmatism and too wary of logic; James thought Peirce too dense and obscure in his formulations. Nevertheless, the connections between the two founding fathers of pragmatism are clear.

Also well-acknowledged is the influence of Peirce upon John Dewey and a generation of young Johns Hopkins logic students and colleagues including: Oscar Mitchell, Fabien Franklin and Christine Ladd-Franklin. Peirce’s work at JHU had a profound effect upon his students and, although John Dewey initially found Peirce’s logic classes obscure and not like logic as he understood it, he later came to realize the importance of Peirce’s approach. Peirce’s own response to Dewey’s pragmatism was much the same as his response to James’: too “nominalistic.” Dewey, however, fully acknowledged the influence and importance of Peirce, even hailing his work as more pragmatic in spirit than that of William James.

Within the field of logic, Peirce’s greatest passion, he also exercised some influence in his own lifetime. Peirce’s development of Boolean algebra influenced the logician and mathematician Ernst Schröder, with whom Peirce exchanged correspondence and mutual admiration. The outcome of this influence is an interesting and often unacknowledged effect upon the development of modern logic: it is Peirce’s account of quantification and logical syntax that leads to twentieth century logic, not Frege’s. Of course, Frege’s work is important and predates much of Peirce’s development by five years or so, but at the time, it was all but ignored. It is from Peirce that we can trace a direct line of influence and development, through Schröder to Peano, and finally to Russell and Whitehead’s *Principia Mathematica*. 
The Interpretation of Peirce’s Philosophy

Peirce’s approach to philosophy is that of an established scientist; he treated philosophy as an interactive and experimental discipline. This scientific approach to Philosophy, which Peirce labeled “laboratory philosophy,” reflects important themes throughout his work. Pragmatism, for instance, takes the meaning of a concept to depend upon its practical bearings. The upshot of this maxim is that a concept is meaningless if it has no practical or experiential effect on the way we conduct our lives or inquiries. Similarly, within Peirce’s theory of inquiry, the scientific method is the only means through which to fix belief, eradicate doubt and progress towards a final steady state of knowledge.

Clearly then, Peirce is a scientifically minded philosopher, and on some readings appears to trump the Vienna positivists to a verificationist principle of meaning and scientific vision of philosophy. In other respects, though, Peirce often focuses on topics outside the remit of scientific and naturalistic philosophy. For instance, Peirce wrote extensively on issues in metaphysics where he defined universal categories of experience or phenomena, after Kant. He also constructed vast systems of signs and semiotics. Of course, all of these endeavors are colored, in some respects, by his distinctly scientific turn of mind. However, the point is that Peirce’s philosophical writings cover more than half a century and a wide range of topics.

The breadth of Peirce’s philosophical interests has lead to some difficulty in interpreting his work as a whole. How, for instance, do his metaphysical writings relate to his work on truth and inquiry? Thomas Goudge (1950) argues that Peirce’s works consist of two conflicting strands, one naturalistic and hard headedly scientific, the other metaphysical and transcendental. Others take Peirce’s work, both naturalistic and transcendental, to be part of an interrelated system. Murray Murphey (1961) argues that Peirce never quite succeeded in integrating his various philosophical themes into a unified whole and identifies four separate attempts. However, the view that a single architectonic system exists has since replaced this view. Important work by Christopher Hookway (1985), Douglas Anderson (1995) and Nathan Houser (1992) shows how fruitful this treatment of Peirce is and now constitutes the orthodox position in interpreting his work. Their view treats Peirce’s philosophy as a panoramic connected vision, containing themes, issues and
areas that Peirce worked upon and moved between at various points in his life. However, treating Peirce’s work as a connected whole can prove awkward when encountering this material for the first time.

**Pragmatism**

[http://www.iep.utm.edu/pragmati/](http://www.iep.utm.edu/pragmati/)

Pragmatism is a philosophical movement that includes those who claim that an ideology or proposition is true if it works satisfactorily, that the meaning of a proposition is to be found in the practical consequences of accepting it, and that unpractical ideas are to be rejected. Pragmatism originated in the United States during the latter quarter of the nineteenth century. Although it has significantly influenced non-philosophers—notably in the fields of law, education, politics, sociology, psychology, and literary criticism—this article deals with it only as a movement within philosophy.

**Peirce’s Early Pragmatism**

[http://www.iep.utm.edu/peircepr/](http://www.iep.utm.edu/peircepr/)

The earliest clear statement of Peirce’s pragmatism comes from his 1878 paper “How To Make Our Ideas Clear.” In this paper, Peirce introduces a maxim, or principle, which allows us to achieve the highest grade of clarity about the concepts we use. Peirce introduces this principle, which we shall discuss in detail below as the third grade of clarity, as a development of the rationalist notion of “clear and distinct ideas.” Combining his pragmatic maxim with notions of clarity from Descartes and Leibniz, Peirce identifies three grades of clarity or understanding.

The first grade of clarity about a concept is to have an unreflective grasp of it in everyday experience. For instance, my inclination to keep some part of my body in stable contact with a supported horizontal surface at all times suggests that I have an underlying grasp of gravity. The second grade of clarity is to have, or be capable of providing, a definition of the concept. This definition should also be abstracted from any particular experience, i.e., it
should be general. So, my ability to provide a definition of gravity (as, say, a force which attracts objects to a point, like the center of the earth) represents a grade of clarity or understanding over and above my unreflective use of that concept in walking, remaining upright, etc.

For Peirce, these two grades of clarity are only part way to a full understanding of a concept; there is a richer level of clarity. It is at this point that he introduces his own third grade of clarity. Peirce says:

Consider what effects, which might conceivably have practical bearings, we conceive the object of our conception to have. Then the whole of our conception of those effects is the whole of our conception of the object. (Peirce 1878/1992, p. 132)

On this account, then, to have a full understanding of some concept we must not only be familiar with it in day to day encounters, and be able to offer a definition of it, we must also know what effects to expect from holding that concept to be true.

For instance, a full understanding of the concept of “vinegar” comes from possessing all three grades of clarity about it. If I am able to identify vinegar and use the concept appropriately in my everyday experiences, I display the first grade of clarity about this concept. My ability to define “vinegar” as a diluted form of acetic acid, which is sharp to the taste, displays the second grade of clarity. Finally, from the use of “vinegar” in definitional propositions like “vinegar is diluted acetic acid” and “vinegar is sharp to taste,” I can derive a list of conditional propositions which indicate what to expect from actions upon, and interactions with, this concept. So, for instance, “vinegar is acetic acid” would lead me to form the expectation that “If vinegar is acetic acid, then if I dip litmus paper into it, it will turn red.” Having a list of conditional propositions like this, which express the differences this concept can make to expected experiences, allows me to achieve the highest grade of clarity about that concept. This third and final grade of clarity is the earliest statement of what we now know as the pragmatic maxim; it is the crux of Peirce’s early theory of pragmatism.
Peirce's Theory of Signs

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https://plato.stanford.edu/entries/peirce-semiotics/

Peirce's Sign Theory, or Semiotic, is an account of signification, representation, reference and meaning. Although sign theories have a long history, Peirce's accounts are distinctive and innovative for their breadth and complexity, and for capturing the importance of interpretation to signification. For Peirce, developing a thoroughgoing theory of signs was a central philosophical and intellectual preoccupation. The importance of semiotic for Peirce is wide ranging. As he himself said, “[...] it has never been in my power to study anything,—mathematics, ethics, metaphysics, gravitation, thermodynamics, optics, chemistry, comparative anatomy, astronomy, psychology, phonetics, economics, the history of science, whist, men and women, wine, metrology, except as a study of semiotic” (SS 1977, 85–6). Peirce also treated sign theory as central to his work on logic, as the medium for inquiry and the process of scientific discovery, and even as one possible means for 'proving' his pragmatism. Its importance in Peirce's philosophy, then, cannot be overestimated.

Across the course of his intellectual life, Peirce continually returned to and developed his ideas about signs and semiotic and there are three broadly delineable accounts: a concise Early Account from the 1860s; a complete and relatively neat Interim Account developed through the 1880s and 1890s and presented in 1903; and his speculative, rambling, and incomplete Final Account developed between 1906 and 1910. The following entry examines these three accounts, and traces the changes that led Peirce to develop earlier accounts and generate new, more complex, sign theories. However, despite these changes, Peirce's ideas on the basic structure of signs and signification remain largely uniform throughout his developments. Consequently, it is useful to begin with an account of the basic structure of signs according to Peirce.
1. Basic Sign Structure

In one of his many definitions of a sign, Peirce writes:

I define a sign as anything which is so determined by something else, called its Object, and so determines an effect upon a person, which effect I call its interpretant, that the later is thereby mediately determined by the former. (EP2, 478)

What we see here is Peirce's basic claim that signs consist of three inter-related parts: a sign, an object, and an interpretant. For the sake of simplicity, we can think of the sign as the signifier, for example, a written word, an utterance, smoke as a sign for fire etc. The object, on the other hand, is best thought of as whatever is signified, for example, the object to which the written or uttered word attaches, or the fire signified by the smoke. The interpretant, the most innovative and distinctive feature of Peirce's account, is best thought of as the understanding that we have of the sign/object relation. The importance of the interpretant for Peirce is that signification is not a simple dyadic relationship between sign and object: a sign signifies only in being interpreted. This makes the interpretant central to the content of the sign, in that, the meaning of a sign is manifest in the interpretation that it generates in sign users. Things are, however, slightly more complex than this and we shall look at these three elements in more detail.

1.2 The Object

Just as with the sign, not every characteristic of the object is relevant to signification: only certain features of an object enable a sign to signify it. For Peirce, the relationship between the object of a sign and the sign that represents it is one of determination: the object determines the sign. Peirce's notion of determination is by no means clear and it is open to interpretation, but for our purposes, it is perhaps best understood as the placing of constraints or conditions on successful signification by the object, rather than the object causing or generating the sign. The idea is that the object imposes certain parameters that a sign must fall within if it is to represent that object. However,
only certain characteristics of an object are relevant to this process of determination. To see this in terms of an example, consider again the case of the molehill.

The sign is the molehill, and the object of this sign is the mole. The mole determines the sign, in as much as, if the molehill is to succeed as a sign for the mole it must show the physical presence of the mole. If it fails to do this, it fails to be a sign of that object. Other signs for this object, apart from the molehill, might include the presence of mole droppings, or a particular pattern of ground subsidence on my lawns, but all such signs are constrained by the need to show the physical presence of the mole. Clearly, not everything about the mole is relevant to this constraining process: the mole might be a conventional black color or an albino, it might be male or female, it might be young or old. None of these features, however, are essential to the constraints placed upon the sign. Rather, the causal connection between it and the mole is the characteristic that it imposes upon its sign, and it is this connection that the sign must represent if it is to succeed in signifying the mole.
1.3 The Interpretant

Although there are many features of the interpretant that bear further comment, here we shall mention just two. First, although we have characterized the interpretant as the understanding we reach of some sign/object relation, it is perhaps more properly thought of as the translation or development of the original sign. The idea is that the interpretant provides a translation of the sign, allowing us a more complex understanding of the sign's object. Indeed, Liszka (1996) and Savan (1988) both emphasize the need to treat interpretants as translations, with Savan even suggesting Peirce should have called it the translatant (Savan 1988, 41). Second, just as with the sign/object relation, Peirce believes the sign/interpretant relation to be one of determination: the sign determines an interpretant. Further, this determination is not determination in any causal sense, rather, the sign determines an interpretant by using certain features of the way the sign signifies its object to generate and shape our understanding. So, the way that smoke generates or determines an interpretant sign of its object, fire, is by focusing our attention upon the physical connection between smoke and fire.

For Peirce, then, any instance of signification contains a sign-vehicle, an object and interpretant. Moreover, the object determines the sign by placing constraints which any sign must meet if it is to signify the object. Consequently, the sign signifies its object only in virtue of some of its features. Additionally, the sign determines an interpretant by focusing our understanding on certain features of the signifying relation between sign and object. This enables us to understand the object of the sign more fully.

Although this is a general picture of Peirce's ideas about sign structure, and certain features are more or less present, or given greater or lesser emphasis at various points in Peirce's development of his theory of signs, this triadic structure and the relation between the elements is present in all of Peirce's accounts. In what follows, we shall see three of Peirce's attempts at giving a full account of signs and signification, the corresponding sign typologies, look at the transitions between these accounts, and examine some of the issues that arise from them.
2.1 Thought-Signs

An interesting feature of Peirce’s early account is that he is keen to associate signs with cognition. In particular, Peirce claims that all thought is in signs (W2. 213). We can see this from Peirce’s early idea that every interpretant is itself a further sign of the signified object. Since interpretants are the interpreting thoughts we have of signifying relations, and these interpreting thoughts are themselves signs, it seems to be a straight-forward consequence that all thoughts are signs, or as Peirce calls them “thought-signs”. One interesting consequence of this is that in the early account, Peirce is quick to dismiss the importance and relevance of icons and indices.

The objects of the understanding, considered as representations, are symbols, that is, signs which are at least potentially general. But the rules of logic hold good of any symbols, of those which are written or spoken as well as those which are thought. They have no immediate application to likeness [icons] or indices, because no arguments can be constructed of these alone, but do apply to all symbols. (W2. 56)

This gives Peirce’s early account of signs a rather narrow scope; it is concerned primarily with the general and conventional signs of which our language and cognition consist. The reason for this narrow focus is simple: for Peirce, since symbols are “potentially general” and fall under the remit of general rules, they are a fit subject of study for his primary focus, logic. This early account, then, focuses mainly on general and conventional signs, those signs identified by Peirce as symbols. Icons and indices, although noted at this early stage, are considered of secondary philosophical importance. As we shall see later, this narrow focus is something that Peirce was later to revise.
Charles Sanders Peirce: Architectonic Philosophy

http://www.iep.utm.edu/peircear/

The subject matter of architectonic is the structure of all human knowledge. The purpose of providing an architectonic scheme is to classify different types of knowledge and explain the relationships that exist between these classifications. The architectonic system of C. S. Peirce (1839-1914) divides knowledge according to its status as a "science" and then explains the interrelation of these different scientific disciplines. His belief was that philosophy must be placed within this systematic account of knowledge as science. Peirce adopts his architectonic ambitions of structuring all knowledge, and organizing philosophy within it, from his great philosophical hero, Kant. This systematizing approach became crucial for Peirce in his later work. However, his belief in a structured philosophy related systematically to all other scientific disciplines was important to him throughout his philosophical life.
The hierarchical classification of sciences in relation to philosophy and the hierarchical structure of philosophy itself, then, looks, roughly, as follows:

1) MATHEMATICS

2) PHILOSOPHY
   which consists of:
   a) Phenomenology
   b) Normative Science
      which consists of:
      i) AESTHETICS
      ii) ETHICS
      iii) LOGIC
         which consists of:
         a) Philosophical Grammar
         b) Critical Logic
         c) Methodeutic
      c) Metaphysics

3) PHYSICAL SCIENCE
a. Phenomenology

The first and most abstract of philosophy's sub-disciplines is phenomenology. For Peirce, phenomenology is the science of appearances and is abstract in the sense that its subject matter is still general and hypothetical, just as the constructs of mathematics are. However, whereas the general hypothetical subject of mathematics and mathematical reasoning is any theoretical construct, for phenomenology the constructs are those of experience, considered in generalized terms.

In his discussion of phenomenology, Peirce divides all our experience into three general, universal categories and names them \textit{firstness}, \textit{secondness}, and \textit{thirdness}. Peirce's categories are notoriously hard to understand. Indeed, Peirce thought it to be a science which we could only gain a hazy grasp of until we discovered the categories for ourselves in the course of our own experiences. The major problem with the categories, though, is that they are general and therefore difficult to explain in readily comprehensible terms. The best way to understand the categories, then, is to look at concrete examples that, in some way, exemplify firstness, secondness, or thirdness.

Peirce usually attempts to explain firstness, in general terms, as quality or feeling. It is perhaps more intuitive to grasp firstness this way: think of William James, Charles Peirce and Karl Marx; they all share the quality of being bearded. Let us abstract "beardedness" from this group of men and, when we consider that abstraction in and of itself, we are considering a firstness which those philosophers all share. Of course, the general concept of firstness is purer than this; "beardedness" is just an exemplification of it. Another example might come from Wittgenstein's discussion in the \textit{Philosophical Investigations} of how we attend to shapes and colors of some objects. When I try to observe the shape of a vase, in separation from its color, size, etc., by squinting my eyes and tilting my head, I am attempting to observe a firstness of that object.

Resistance, existence or otherness, are all examples of secondness. Peirce often uses the scholastic concept of haecceity, or "thisness," to explain our experience of secondness. The idea is that when we experience some thing, we experience it as separate from other phenomena and as a brute thing of existence. It is this brute confrontational singularity.
that a thing experienced must have that Peirce thinks exemplifies secondness. It is our experience of an object as a thing separate to others within the universe that is an experience of secondness. A rather strange example might prove helpful in coming to understand what our experience of secondness might be like. Some historical commentaries of the first landings of the Spanish Conquistadors in South America report how the natives were in awe of these strange four-legged, two-armed, two headed God-like creatures. It seems that the Spanish rode ashore on horse back. Having never seen horses or white men before (let alone white men riding horses), the natives assumed that this was one creature. This seems like a rather strange case, but it perhaps provides a startling example of how we must re-organize our understanding when our experience fails to distinguish two instances of secondness. Of course, the minute the Conquistadors dismounted, the natives experienced the invader as separate to his horse, thereby experiencing his secondness.

Our experiences of mediation, intelligibility or understanding are examples of thirddness. When we place some experience within the structure of our understanding, when we assimilate an experience, we are experiencing thirddness. In many ways, thirddness is similar to the Hegelian notion of "synthesis" and captures the notions of development and growth. When we experience thirddness, we experience some sense of bringing phenomena into order with our knowledge. Principle exemplifiers of thirddness, then, are phenomena like laws, habits, conventions, reason, etc. Extending our previous example of the Conquistador, when the native saw him dismounted and experienced him as separate from his horse, he might also have come to understand that this stranger was, in fact, a man. This experience of understanding how this phenomenon fits into the world is, according to Peirce, meant to be an experience of thirddness.

The three categories are present in all experience but to differing degrees. Consequently, an experience of a quality like redness has firstness, secondness and thirddness; but it has firstness to a greater extent and so exemplifies that category. To see this, we should at least be clear that, as a quality, "redness" is a firstness just as "beardedness" is. However, our experience of the "redness" as existing means that it has secondness. Otherwise, we would be unable to experience it. And the fact that we are able to understand our experience of "redness" as just such an experience, means that it must also have an element of thirddness,
otherwise we would be unable to assimilate that experience. So, our experience of "redness" has all three categories to some extent. However, the actual qualitative aspects of the experience, the very reason we call this an experience of "redness," are what predominate, and this is why we classify "redness" as a first, even though all of the categories are present to some extent.

Furthermore, despite the abstract nature of phenomenology, i.e., the hypothetical status of its constructs, it is not at odds with Peirce's scientific and experiential approach. As suggested earlier, Peirce maintains that phenomenology is something that we each must carry out and confirm for ourselves in our own experience. So, despite the initially abstract and theoretical appearance of phenomenology, it remains grounded in practice.

Who is the most original and the most versatile intellect that the Americas have so far produced? The answer "Charles S. Peirce" is uncontested, because any second would be so far behind as not to be worth nominating. [He was] mathematician, astronomer, chemist, geodesist, surveyor, cartographer, metrologist, spectrosocist, engineer, inventor; psychologist, philologist, lexicographer, historian of science, mathematical economist, lifelong student of medicine; book reviewer, dramatist, actor, short story writer; phenomenologist, semiotician, logician, rhetorician and metaphysician.

Max H. Fisch in Sebeok, *The Play of Musement*

http://www.peirce.org/