

# Grammar, logic and community in science: Charles Sanders Peirce and his presuppositional classification of the sciences

**Patrick J. Coppock**

The University of Modena and Reggio Emilia  
Department of Social, Cognitive and Quantitative Science  
E-mail: <patcop@unimore.it>

“The genius of a man’s logical method should be loved and revered as his bride, whom he has chosen from all the world. He need not condemn the others; on the contrary, he may honor them deeply, and in doing so he only honors her more. But she is the one that he has chosen, and he knows that he was right in making that choice. And having made it, he will work and fight for her, and will not complain that there are blows to take, hoping that there may be as many and as hard to give, and will strive to be the worthy knight and champion of her from the blaze of whose splendors he draws his inspiration and his courage.”

C.S. Peirce in *The Fixation of Belief*, 1877

“...every scientific research goes upon the assumption, the hope, that in reference to its particular question, there is some true answer. That which that truth represents is a reality. This reality being cognizable and comprehensible, is of the nature of a thought. Wherein, then, does its reality consist? In the fact that, though it has no being out of thought, yet it is as it is, whether you or I or any group of men think it to be or not.”

C.S. Peirce [Collected Papers 8.118]

## **Preamble: Peirce the man – a scientist philosopher**

The American philosopher Charles Sanders Peirce was, in the words of one modern philosopher who knew and understood Peirce’s life and work as few have done since, namely Max Fisch (1981): “the most original and the most versatile intellect that the Americas have so far produced”<sup>1</sup>. Fisch goes on to credit Peirce with having maintained a truly vast range of interests and consistent and lasting involvement in many different fields of science throughout his life - he was, he writes: “Mathematician, astronomer, chemist, geodesist, surveyor, cartographer, meteorologist, spectroscopist, 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[.]” [ibid.]

---

<sup>1</sup> In Sebeok (1981), also quoted in Brent 1993, p. 2f.

Born in Cambridge, Massachusetts on September 10, 1839, Charles Peirce was second son of the influential and respected Harvard mathematician and astronomer Benjamin Peirce and his wife Sarah Hunt Mills Peirce. His original and innovative thought and prolific writing (some estimates, see e.g. Fisch, Ketner & Kloesel (1979), put the total number of publications throughout his life to 800, running to around 12,000 pages, and his complete Nachlass comprises around 100,000 pages in all (though estimates vary - see also footnote 2 below)) remained largely unread on a wider scale during his lifetime, and he was generally misunderstood in his own time. Partly due to this fact, as well as to his rather complex and abrasive personality as well as his general lack of concern for what others might have thought of him, both his academic and private lives were not easy ones, and he died of cancer in 1914 in more or less abject poverty with his greatest, life-long philosophical project not yet realised.

It is not the purpose of this essay to examine Charles Sanders Peirce's tortuous and tragic life history in detail – those readers who may be interested in doing so are encouraged to read those more specifically biographical works which have already been published, such as those by Joseph Brent (1993) and Robert Corrington (1993) – see also Murphey 1993 for some useful biographical information on the dynamics of the father-son relationship between Charles and Benjamin Peirce. I think though, in passing, that it is important to mention here that it is still my, and many other much more experienced Peirce scholars' than I, contention that a completely adequate, fair and fully representative biography of Charles Sanders Peirce multifaceted and intensely productive life, thought and work has yet to be written, and it is only to be hoped that this sorry lack in the social and cultural history of philosophy and science will be satisfactorily remedied at some future time.

### **Main source materials**

In this essay I have drawn heavily on three main historical and explicatory sources. Only the first of these can really be considered as a true “primary” source, in the sense that it was actually written by Peirce himself, and although it is not generally considered among his philosophical or scientific writings, it is nonetheless a specialised piece of scientific writing which is of great interest in this particular context, namely the written application for funding of his work that Peirce made in 1902 to the Carnegie Institution, the basic structure and contents of which will be discussed in some detail here.

My most important secondary source is the slightly revised 1993 version of Murray Murphey's useful and highly informative book, first published in 1961: “The Development of Peirce's Philosophy” (Murphey 1993), which I have found especially functional in this particular context, in the sense that Murphey during his research and writing of it had access (which very few Peirce scholars have actually had) to the majority of Peirce's hand-written manuscripts now stored at the Harvard University library, and he has thus been able to draw in his discussions on many manuscripts that have not yet been (and perhaps never will be) published. This is something which seems to me absolutely vital if one is to develop a clear understanding of how Peirce worked steadily and consistently on developing and refining his philosophical system throughout the whole of his working life. Not only has Murphey had access to these seldomly read materials, but he has also managed to build a comprehensive,

and by and large clear and easily readable overview of the various transitions through which Peirce's thought and writing went over time.

The third and final source regarding Peirce's semeiotic is a recent book from the hand of James Jakób Liszka (1996): "A General Introduction to the Semeiotic of Charles Sanders Peirce", recently characterised by such an eminent Peirce scholar as Nathan Houser as "[t]he best and most balanced full account of Peirce's semeiotic which contributes not only to semiotics but to philosophy". This being, as far as I am able to judge, is an even modest appraisal of this well-written and researched piece of work which has provided much inspiration for my writing of this present essay.

One more supplementary source, this time regarding Kant, which I have also drawn on at some length, and which ought to be mentioned specifically here, is the 1993 Cambridge Edition of Immanuel Kant's "Opus postumum" in English, translated by Eckart Förster (who was also its editor) and Michael Rosen; a book which I have found to be an extremely fruitful source for some of my discussions in this present paper. Förster's thoughtful and thorough introduction to "opus postumum" has been especially useful, and a large part of my discussion of the "Opus" is based on his systematic and concise overview and analysis of this Kant's truly "final work".

### **On engaging Peirce through his writings**

One of the main problems in reading and interpreting Peirce's philosophy today is that although he had, as mentioned above, a truly prodigious body of publications by any set of academic standards, many of these were of more technical nature since he mainly made his living and published as a scientist, rather than as a philosopher. His degree which he obtained from Harvard University in 1863 was in chemistry, and he subsequently worked for thirty years for the United States Coast and Geodetic Survey. He was also associated for a number of years, starting in 1869, with the Harvard Observatory. The one full book that he published, "Photometric Researches" (1878) embodied the results of a series of astronomical observations that he had made there. Max Fisch (1981) mentions in this connection too, that Peirce was amongst other things the first metrologist to use a wave-length of light as a unit of measure, the inventor of the quincuncial projection of the sphere, the first conceiver of the design and theory of an electric switching-circuit computer, and the founder of "the economy of research". He was, continues Fisch, "the only system-building philosopher in the Americas who has been both competent and productive in logic, in mathematics, and in a wide range of sciences." These were in fact only a few of Peirce's wider scientific (i.e. rather than specifically philosophical) achievements for which he gained considerable recognition in his own lifetime, perhaps especially in Britain and Europe rather than in the United States. Indeed, one of the more influential British proponents of logical positivism during the pre- and post-war periods, Alfred J. Ayer, notes admiringly in the introduction to his book "The Origins of Pragmatism" (Ayer 1968, p. 5) that Peirce was: "... familiar, to an extent that few philosophers are, with the methods and conclusions of the natural sciences and himself engaged in scientific research.", going on to note in the same passage that his own contemporary colleague Carl Popper's then highly renowned theory of scientific method had largely been anticipated by Peirce.

Peirce's philosophical works were, however, only published in a fairly fragmented way before a concerted effort was begun to collate and publish a systematic collection of a large part of his writings in 1931<sup>2</sup>. Prior to this, Peirce's philosophically oriented publications had been mainly limited to a series of five articles that appeared in *Proceedings of the American Academy of Arts and Sciences* in 1867<sup>3</sup>, a series of three articles in *Journal of Speculative Philosophy*, 1868-1869<sup>4</sup>, a series of six articles in *Popular Science Monthly*, 1877-1888<sup>5</sup>, and two in French in *Revue Philosophique de la France et de L'Étranger*, 1878-1879<sup>6</sup>, as well as a number of contributions to *The Nation* in the years following his move to Milford, Pennsylvania in 1887. Finally, there was the famous series of five articles which appeared in *The Monist* between 1891 and 1893. (see footnote 12 below).

In this essay I will focus on and discuss in some more depth one important aspect of Charles Sanders Peirce's lifelong philosophical endeavour, namely his work in the later part of his life to develop a systematic classification of the sciences, which will in turn be seen in relationship to his even larger life-project of developing a general architectonic system of philosophical logic, which Peirce himself often referred to as his Semeiotic. To this end we shall first have a closer look at Peirce's application for funding to the Carnegie Institution of 1902.

### **The Carnegie Institution application of 1902**

In 1902 Peirce submitted an unsuccessful<sup>7</sup> application to the Carnegie Institution for economic aid in order to accomplish, as he chose to frame it himself in his opening letter, "certain scientific work". Peirce's application opened with the following brief introductory epistle directed to the Executive Committee of the institution:

Milford, Pa., 1902, July 15

---

<sup>2</sup> It is true that in 1923 a small edition of some of Peirce's essays was published under the title 'Chance, Love and Logic', editor M.R. Cohen, with a foreword by John Dewey. Nonetheless, it was not until 1931 that the more concerted effort to publish Peirce's works mentioned above began. During the years 1931-1935 six volumes (I-VI) of an eight volume series: 'Collected Papers of Charles Sanders Peirce' were published, edited by Charles Hartshorne and Paul Weiss. These six volumes were later reissued as three volumes in 1960. Volumes VII-VIII which were edited by Arthur W. Burks, were published in 1958. In the eight volumes of 'Collected Papers...' the textual materials are structured more or less thematically rather than chronologically, something which makes it difficult to follow the development of Peirce's ideas over time. At the present time there is a project in process that aims over time to publish a fully chronological version of Peirce's entire writings in thirty volumes. This work was initiated at the beginning of the 1980's as the Peirce Edition Project at Indiana - Purdue University at Indianapolis by Edward C. Moore, first under the general editorship of Max H. Fisch, thereafter of Christian Kloesel, and at present under the direction of Nathan Houser. Five of the thirty proposed volumes have been published so far

<sup>3</sup> All the following were published in *Proceedings of the American Academy of Arts and Sciences* 7 (1867): "On an Improvement in Boole's Calculus of Logic." (pp. 250-261); "On the Natural Classification of Arguments." (pp. 261-287); "On a New List of Categories." (pp. 287-298); "Upon the Logic of Mathematics." (pp. 402-412) and "Upon Logical Comprehension and Extension." (pp. 416-432).

<sup>4</sup> These were: "Questions Concerning Certain Faculties Claimed for Man.", *Journal of Speculative Philosophy*, 2 (1868), pp. 103-114; "Some Consequences of Four Incapacities.", *JSP* 2 (1868), pp. 140-157 and "Grounds of Validity of the Laws of Logic: Further Consequences of Four Incapacities.", *JSP* 2 (1869), pp. 193-208.

<sup>5</sup> "The Fixation of Belief.", *Popular Science Monthly* 12 (November 1877), 1-15; "How to Make Our Ideas Clear.", *PSM* 12 (January 1878), 286-302; "The Doctrine of Chances.", *PSM* 12 (March 1878), pp. 604-615; "The Probability of Induction.", *PSM* 12 (April 1878), pp. 705-718; "The Order of Nature.", *PSM* 13 (June 1878), pp. 203-217 and "Deduction, Induction, and Hypothesis.", *PSM* 13 (August 1878), pp. 470-482.

<sup>6</sup> These were: "Comment se fixe la croyance.", *Revue Philosophique de la France et de L'Étranger*, 6 (December 1878), pp. 553-569; "Comment rendre nos idées claires.", *RPFLÉ* 7 (January 1879), pp. 39-57.

<sup>7</sup> For a recent examination of why this application may have failed, see Brent 1993, pp. 278-289

To the Executive Committee of the Carnegie Institution,

Gentlemen:

I have the honor respectfully to submit to you herein an application for aid from the Carnegie Institution in accomplishing certain scientific work. The contents of the letter are as follows:

1. Explanation of what work is proposed. Appendix containing a fuller statement.
2. Considerations as to its Utility.
3. Estimate of the Labor it will involve.
4. Estimate of Other Expense involved.
5. Statement as to the Need of aid from the Carnegie Institution.
6. Suggestion of a Plan by which aid might be extended.
7. Estimate of the Probability of Completion of the work, etc.
8. Remarks as to the Probable Net Cost to the Carnegie Institution, in money and in efficiency.
9. Statement of my apprehension of the Basis of my claim for aid.

[MS L75 FV 345]

Joseph Ransdell (1994a) who has helpfully, while working together with Ken Ketner at the Institute for Studies in Pragmatism at the end of 1970's, had transcribed all the Carnegie Institution application documents and the five draft versions that Peirce wrote in the process of writing the application and subsequently made them available in edited, digital text form<sup>8</sup>, notes in his brief introduction and commentary to the transcribed version that in referring to the "Appendix containing a fuller statement." under point 1. above, "Peirce means the entire list of 36 proposed "Memoirs," including his accompanying descriptions of their contents"<sup>9</sup> It is actually this Appendix of 36 Memoirs that makes up the main body of the application, which in the final version ran to in all 80 pages. Ransdell comments too in this connection that:

"...the projected 36 memoirs represent topically Peirce's entire system of philosophy as analysed by him in terms of the presuppositional order of its parts, which he articulates in his classification of the sciences. (Peirce regards a science as a social activity controlled critically by the norm of truth and, in his view, philosophy can be like that.) (Ransdell 1994b, p. 6)<sup>10</sup>

---

<sup>8</sup> Ransdell has edited and made available via the Internet the entire contents of the whole application document folder MS L75 – including a collection of five draft versions of the nine explanatory sections of the application and the appendix containing 36 "Memoirs" (see Ransdell 1994b for further details of how these are structured and presented) – the originals of which are under the custody of the Department of Philosophy of Harvard University. The electronic document folder is denoted as MS L 75 since the original manuscripts of Peirce's Carnegie application, together with five draft versions of the same are stored physically in folder L75 at the Houghton Library, Harvard University (see Neuman (no date available, but probably 1994) for some more detail on this point). In passing it should also be mentioned that the Houghton Library has custody over approximately 90,000 typescript and manuscript pages comprising the main Peirce corpus, which though probably not representing Peirce's entire Nachlass, is certainly the largest collection of his original philosophical and scientific writings existing anywhere in the world.

<sup>9</sup> See note in MS L75, electronic full text version, p. 3. The whole MS L75 folder has been made available by the Electronic Peirce Consortium via World Wide Web in ASCII text format at the following URL:  
[gopher://accgopher.georgetown.edu/11gopher\\_root%3A%5Bpeirce.top%5D](gopher://accgopher.georgetown.edu/11gopher_root%3A%5Bpeirce.top%5D)

<sup>10</sup> Based on this insight, Ransdell goes on to forward the thesis that the entire corpus of Peirce's work, both published and unpublished, could be organised thematically (for example as a hypertext web) using the skeleton overview provided by the tabular version of the thirty six memoirs given by Peirce in the application as a topical schema, supposing that his writings were decomposed into appropriate topical units. This would allow us to see how in fact, as Ransdell formulates it: "Peirce actually did work out his system of thought in as much detail as anybody could reasonably be expected to do." [ibid.] I too believe that such a project would be a highly useful and enlightening undertaking, but any further discussion of this particular theme must, however, be considered as falling outside the scope of this present essay.

Peirce's application to the Carnegie Institution was in many ways a kind of last-ditch attempt (he was at the time he made it sixty three years old) to gain sufficient economic collateral to realise in a synthesising way what he had always considered to be his true life project, namely the development and refinement of his "Logic" or "Semeiotic", as he often referred to it. As Peirce himself notes candidly at the beginning of the final version of Section 1, "Explanation of what work is proposed":

"Some personal narrative is here necessary. I imbibed from my boyhood the spirit of positive science, and especially of exact science; and early became intensely curious concerning the theory of the methods of science; so that, shortly after my graduation from college in 1859, I determined to devote my life to that study; although indeed it was less a resolve than an overmastering passion which I had been for some years unable to hold in check. It has never abated." [MS L75, FV (346-349)]

Peirce goes on to round off this initial explanatory section with the following statement of intent:

"Therefore, what I hereby solicit the aid of the Carnegie Institution to enable me to do is to draw up some three dozen memoirs, each complete in itself, yet the whole forming a unitary system of logic in all its parts, which memoirs shall present in a form quite convincing to a candid mind the results to which I have found that the scientific method unequivocally leads, adding in each case, rational explanations of how opposing opinions have come about; the whole putting logic, as far as my studies of it have gone, upon the undeniable footing of a science." [ibid.]

The key concepts in the two quotes above are undoubtedly "theory of the methods of science", "a unitary system of logic in all its parts" and finally "putting logic [...] upon the undeniable footing of a science". The particular wordings that Peirce has chosen to represent what he perceived as the main objectives of his project clearly reflect that he was concerned with presenting for the wider scientific community (cf. his formulation "in a form quite convincing to a candid mind" above) in a coherent and synthesised form what Murphey (1993, p. 355) refers to as his "architectonic theory", an "all-embracing system which would serve as the framework for all future discovery and knowledge". The "three dozen memoirs", as Peirce lists them in his final version of his Carnegie application are shown below. Note that although the actual titles of each of the thirty six memoirs in the table below are Peirce's own, the terms in brackets have been usefully inserted by Ransdell when he edited the transcribed version of the text in order to clarify how the various groups of memoirs actually relate to certain central sections of Peirce's classification of the sciences. We shall go on to examine this particular relationship in some more detail later on.

## **The Memoirs**

### LIST OF PROPOSED MEMOIRS

1 On the Classification of the Theoretic Sciences of Research

[MATHEMATICS]

- 2 On the Simplest Mathematics
- 3 Analysis of the Conceptions of Mathematics
- 4 Analysis of the Methods of Mathematical Demonstration

[PHENOMENOLOGY (or PHANEROSCOPY)]

- 5 On the Qualities of the Three Categories of Experience
- 6 On the Categories in Their Reactional Aspects
- 7 On the Categories in Their Mediate Aspects
- 8 Examination of the Historical Lists of Categories

[THE NORMATIVE SCIENCES: ESTHETICS, ETHICS, AND LOGIC]

- 9 On the Bearing of Esthetics and Ethics upon Logic

[LOGIC IN THE BROAD SENSE (= SEMIOTIC)]

- 10 On the Presuppositions of Logic
- 11 On the Logical Conception of Mind
- 12 On the Definition of Logic
- 13 On the Division of Logic
- 14 On the Method of Discovering and Establishing the Truths of Logic

[PHILOSOPHICAL (“SPECULATIVE”) GRAMMAR (here called “Stechiologic”)]

- 15 Of the Nature of Stechiologic
- 16 A General Outline of Stechiologic
- 17 On Terms
- 18 On Propositions
- 19 On Arguments

[CRITICAL LOGIC (THEORY OF INFERENCE)]

- 20 Of Critical Logic in General
- 21 Of First Premises
- 22 The Logic of Chance
- 23 On the Validity of Induction
- 24 On the Justification of Abduction
- 25 Of Mixed Arguments
- 26 On Fallacies

[PHILOSOPHICAL (“SPECULATIVE”) RHETORIC (here called “Methodeutic”)]

- 27 Of Methodeutic
- 28 On the Economics of Research
- 29 On the Course of Research
- 30 On Systems of Doctrine
- 31 On Classification
- 32 On Definition and the Clearness of Ideas [i.e. pragmatism]
- 33 On Objective Logic

[METAPHYSICS]

- 34 On the Uniformity of Nature
- 35 On Metaphysics
- 36 On the Reality and Nature of Time and Space

[THE SPECIAL SCIENCES would follow here, in the presuppositional order which underlies his classification of the sciences]

## **The classification of the sciences and the architectonic of logic**

Liszka (1996, p. 3) characterises Peirce's work to develop a systematic classification of the sciences in the following way:

“His system reflects a very broad, classical sense of “science”, not restricted to the modern empirical sciences alone, but understood as any attempt to systematise knowledge [CP 1.234]. Thus he could include under the label of “science” not only laboratory sciences such as chemistry but also human sciences such as ethnology, as well as disciplines such as history and literary and art criticism [CP 1.201]. His schema suggests two main *branches* of science so understood, theoretical and practical [CP 1.239]. These are further subdivided into the sciences of discovery, review and the practical sciences [CP 1.181]. The division in terms of branches corresponds to the *purpose* of the science, so that the theoretical sciences aim at the discovery of knowledge, whereas the goal of the sciences of review is the organisation of the sciences and the practical ones have as their goal the application of knowledge.”

While, in more or less the same vein, Murray Murphey (1993) has noted that:

“[i]t was Peirce's endeavour to build a cosmological theory which would be broad enough to afford a view of the probable course of future events yet specific enough to be scientifically acceptable. To do this there were certain requirements which the theory had to meet. The first was that the system had to be constructed architectonically.” (ibid., p. 329)

Framed in Peirce's own words the problem was as follows:

“That systems ought to be constructed architectonically has been preached since the time of Kant, but I do not think that the full import of the maxim has been apprehended. What I would recommend is that every person who wishes to form an opinion concerning fundamental problems should first of all make a complete survey of human knowledge, should take note of all the valuable ideas in each branch of science, should observe in what respect each has been successful and where it has failed, in order that, in the light of the thorough acquaintance so attained of the available materials for a philosophical theory and of the nature and strength of each, he may proceed to the study of what the problem of philosophy consists in, and of the proper way of solving it.” (CP 6.9, cited in Murphey 1993, p. 329)

which Murphey goes on to comment on as follows:

“It is clear that this passage involves a generalisation of Kant's idea of architectonic. Kant had asserted a relation between logic and metaphysics; Peirce here suggests a relation between the special sciences in general and philosophy as a whole. As the subsequent argument of this paper<sup>11</sup>, and of “A Guess at the Riddle”<sup>12</sup>, makes clear, the fundamental ideas of the special sciences turn out to be classifiable by the categories, so that what is being

---

<sup>11</sup> Murphey is referring here to “The Architecture of Theories”, published for the first time in *The Monist*, January 1891. CP 6.7-34)

<sup>12</sup> Murphey notes that this particular paper was never published, but Peirce expanded it instead into a series of five articles which appeared during the next year or so in *The Monist*: “The Architecture of Theories” (CP 6.7-34), “The Doctrine of Necessity Examined” (CP 6.35-65), “The Law of Mind” (CP 6.103-163), “Man's Glassy Essence” (CP 6.238-271), and “Evolutionary Love” (CP 6.287-317). There is also a sixth paper (CP 6.588-618) which is a reply to criticisms made of the other five by Paul Carus, editor of *The Monist*, but this, although providing some important clarifications of points in the other papers, was not part of the original series.

argued is something with which Kant would have fully agreed, namely, that the categories are the basis of all special knowledge. [...] The architectonic theory itself is a kind of classification of science in terms of presupposition although it happens only to involve only logic and metaphysics...the important question is why Peirce should have been interested to do this. After all Kant never bothered to do so. If the categories are true of all thought, they are true of the special sciences by definition – why bother to prove in detail what is obvious a priori? (ibid. p. 329-330)

Interestingly enough, Kant did, in fact, begin considering these kinds of issues later on in his life. His concern with this particular project began around the early 1790's with the idea that in order to complete his life's work it would be necessary to discuss the relationship between physics, and metaphysics; to explain how it would be possible to make, as he phrased it initially, the "transition from the metaphysical foundations of natural science to physics". This would, he felt finally put in order what he later referred to in a letter written in 1798 to Christian Garve as "the unpaid bill of my uncompleted philosophy"<sup>13</sup>. One month later he wrote to Kiesewetter, a former pupil, that "The transition from the metaphysical foundations of natural science to physics [...] must not be left out of the system ... [W]ith that work the task of critical philosophy will be completed and a gap that now stands open will be filled."<sup>14</sup> It was not, however, until 130 years after his death that Kant's "Opus postumum", as it is now referred to, was actually made public as volumes 21 and 22 (1936 and 1938) of his collected works (see the reference list for more details of this).

### **Kant and the transition from metaphysics to physics**

Förster (1993, p. xxxif) points out in his introduction to the English version of *Opus postumum* that even as Kant was working on the final stages of his "Critique of Pure Reason", which was published in 1781, he had in fact begun to think about another way of presenting the results of the "completely new science" that had grown out of his investigations into what he had called the "idea of a transcendental philosophy"[A1, A13]. The necessity of developing this "other way" of discussing his work apparently became even clearer to Kant when he realised that the special sense he had developed for the term "transcendental" had not been widely understood. The first (anonymous) reviewer of the "Critique" in *Göttingischen Gelehrten Anzeigen* had in fact referred to Kant's work as representing "a higher idealism" and allied it with Berkeley's idealism about things, something which had distressed Kant considerably. Immediately after the "Critique" had been published, he therefore began working seriously on a brief account of what he had written on in the "Critique" based on a different kind of plan. It was, in his own words "a plan according to which even popularity might be gained for this study"<sup>15</sup>. The result was the "Prolegomena to Any Future Metaphysics" (1783), where Kant wrote in his preface that "... a mere plan preceding the *Critique of Pure Reason* would be unintelligible, unreliable and useless; it is all the more useful [however], as a sequel... With that work complete, I offer here a plan based on the analytic method, while the *Critique* itself had to be executed in the synthetic style."<sup>16</sup>

---

<sup>13</sup> Cited in Förster 1993, p. xvi

<sup>14</sup> Cited in Förster 1993, p. xvi

<sup>15</sup> Letter from Kant to Marcus Herz after May 1781, AK 10:269, cited in Förster 1993, p. xxxi.

<sup>16</sup> "Prolegomena to any Future Metaphysics" [AK 4:263], cited in Förster 1993, p. xxxi.

In his “Prolegomena” Kant sets out to answer the question of “whether such a thing as metaphysics is at all possible”, and here, interestingly enough, he turns things on their head and starts out from the synthetic *a priori* propositions of mathematics and the natural sciences, which he alleges are uncontested. This being the case, it should then be possible to deduce from the principle that makes *them* possible the possibility of all other synthetic *a priori* propositions. In the “Prolegomena” it is thus the rational sciences of the objects of experience (i.e. mathematics and physics) which are seen as being able to provide the criterion that any science of non-empirical objects (i.e. a metaphysics) must meet. His idea was to make the “plan” of the “Prolegomena” the defining paradigm of transcendental knowledge by playing down the misunderstood idea of *a priori* reference to *Gegenstände überhaupt* as that which transcendental knowledge is concerned, and concentrating instead on the reference to possible experience. He writes that “The word ‘transcendental’ ... does not signify something passing beyond all experience, but something that indeed precedes it *a priori*, but that is intended simply to make knowledge of experience possible.” [AK 4:293], which Förster interprets as meaning that transcendental philosophy now has become for Kant exclusively a theory that discerns the *a priori* conditions of possible experience.

This shift in perspective led Kant to go on and write another paper entitled “The Metaphysical Foundations of Physical Science” (1786), which allowed him to challenge in a more systematic way the charges made by the previously mentioned anonymous review of “Critique of Pure Reason” in *Göttingischen Gelehrten Anzeigen* that his idealism could be compared with that of Berkeley. (“Metaphysical Foundations” was, incidentally, also a step on the way to Kant’s subsequent refutation of idealism in the second edition of the “Critique”.) The main project that Kant carried through apparently to his own satisfaction in “Metaphysical Foundations” was, following closely Förster’s (1993, p. xxiv) more detailed discussion of this, the provision of a philosophical account for the apodictic certainty associated with the fundamental physical laws. Apodictic certainty was, however, only one of the two features which Kant believed any doctrine of nature must exhibit in order to qualify as a science; the other being systematic unity, and thus “Metaphysical Foundations” could not provide insight into the possibility of the systematicity of physics. Since he did not believe that collection of empirical data - an aggregate of perceptions - could provide the kind of *a priori* systematic unity one would expect to find in the laws and propositions of physics, Kant had then to find a way of making it possible for his philosophy to allow for the possibility of physics as a science, by providing principles for the investigation of nature - specific *a priori topoi* for classifying systematically forces of matter that can only be given empirically. It would also be necessary to demonstrate that we can *a priori* expect that nature would actually allow for such classification. The means by which he could do this latter task did not become available until he had written “Critique of Judgement” in 1790, and developed his principle of nature’s appropriateness to our cognition, or as he himself put it: “...the principle of a purposiveness directed to our use of judgement as regards appearances” [AK 5:246, cited in Förster 1993, p. xxxv]. This principle provides the precondition under which a systematic empirical doctrine such as that of physics becomes *a priori* thinkable. When Kant’s principle of the formal purposiveness of nature is seen in conjunction with his theory of matter, which had been explicated at some length in “Metaphysical Foundations”, this makes a transition from the metaphysical foundations of natural science to physics not only possible, but also necessary. The task of the “Transition from the Metaphysical Foundations of Natural Science to Physics” - Kant’s original working title for “Opus postumum” - was then to specify a method of bringing about the systematicity of physics

through an outline of the systematicity of the objects of our outer senses, which is what physics as a science is concerned with.

Initially, Kant had believed that it would be sufficient for him to “follow the clue given by the categories and bring[ing] into play the *moving forces* of matter according to their *quantity, quality, relation* and *modality* in turn.” [AK 21:311], but his numerous attempts to do so in the first part of the “Opus” repeatedly end up tailing off before he actually reaches the category of modality. This is due mainly to the fact that his discussion of the aggregate states of matter under the category of Quality raises the difficult problem of how to classify Calorific (*Wärmestoff*) which when present fluidifies matter, and when absent rigidifies it. Calorific can thus in itself neither be fluid nor rigid, and Kant finds it to be what he calls a “*qualitas occulta*”. This impasse leads him to a further long discussion of Calorific (or ether), which he postulates must be some kind of “categorically given” “world-material” - the first cause of all moving forms of matter, which necessarily would be required if we are to be able to have any kind of outer experiences at all. Since empty space cannot be an object of experience (space and time are, we remember, for Kant merely *a priori* unconditionally given wholes or intuitions), space, in order to be sensible, must be thought of as filled with a continuum of forces extended throughout the cosmos as a whole. Since experience must be a unity, this presupposes a constant motion of all matter on the sense organs of the human subject in order for perception to occur at all. The problem with this is that since Kant believed that we, as subjects, construct only indirect appearances, or appearances of appearances of the things in themselves, which cannot themselves be experienced, there would then be a problem to distinguish between the true object of physics, and these appearances. As Kant phrases it in the “Opus”: “The objects of the senses, regarded metaphysically, are appearances; for physics, however, these objects are things [Sachen] in themselves, which affect sense, or as the subject affects itself (represent *a priori*)” . [AK 22:320]

His solution to this problem is to postulate that the subject constitutes itself as an empirical object by becoming an appearance of an object for itself. This must be done by shifting focus from the moving forces of matter that are in some way external to the subject, to the moving subject. This is possible since any physical body can be considered as a system of moving forces of matter, the concept of natural machines, or living organisms, cannot be excluded from the whole general system of moving forces of matter, something Kant had felt obliged to do previously. Whereas he now writes in this connection that:

“Organic bodies are natural machines, and, like other moving forces of matter, must be assessed according to their mechanical relationships, in the tendency of the metaphysical foundations of natural science; their appearances must be explained in this way, without crossing over into the system of the moving forces of matter according to final causes, which, being of empirical origin, belong to physics.” [AK 21:186]

Because the subject has some consciousness of activating its own moving forces, it can thus anticipate the reacting moving forces of matter. “The subject which makes the sensible representation of space and time for itself is likewise an object to itself in this act. Self-intuition. For without this, there would be no self-consciousness of a substance” [AK 22:443] This allows the concepts of spatial and temporal relations become potentially sensible, something which would not have been possible before the positing of moving forces through

which the subject is affected, these moving forces being necessarily prior. This leads him further into a discussion of the doctrine of self-positing (*Selbstsetzungslehre*), where he also begins to re-examine the notion of *Ding an Sich*, which in turn leads to a discussion of practical self-positing (i.e. the fact that the subject does not only constitute itself as an object of outer sense, but also as a person with rights and duties), and the idea of God. Finally he re-examines the whole question of what transcendental philosophy is, concluding that as well as being synthetic *a priori* knowledge from concepts, it is also the act of consciousness whereby the subject becomes the originator of itself as well as the whole system of technical-practical and moral-practical reason.

This particular later development of Kant's thought is especially interesting in this context to the extent that it shows how in his attempts to come to grips with the problem of qualifying philosophically the possibility of the existence of real external things; i.e. the object of study as it is conceived of by physics, rather than by metaphysics, he moved in a direction which brought him much closer to Peirce's concept of the real - that which "...is as it is, whether you or I or any group of men think it to be or not." [CP 8.118] - and of man as sign - "When we think, then, we ourselves, as we are at the moment, appear as a sign" [CP 5.283] - than one might have initially supposed possible. Further discussion of comparisons on these particular points would of course be of great interest, but since this all represents somewhat of a digression here, we shall merely leave it hanging for now and return to our prior discussion of Peirce and his classification of the sciences.

### **The role of the categories in the architectonic**

Murphey is of the opinion, and in this I would tend to agree with him, that the formulations by Peirce in the passage from the "Architectonic of Theories" from 1891 [CP 6.9] cited above need not necessarily be equated with the origins of his endeavour to create a classification of the sciences, but rather, as can be implied from what Peirce himself says, that his subsequent focus on the considerable task of creating a presuppositionally based classification of the sciences is something that would in any case naturally have developed as a consequence of his many intensive years of work prior to that on his Categories and Semeiotic. Beginning to write down a classification of the sciences would, in this kind of perspective, be for Peirce merely a logical next step towards a further development and refinement of his Semeiotic through the making of, as he put it, "a complete survey of human knowledge"; this, however, being the kind of monumental task which he had not felt he could begin with until after he had solved the most pressing and difficult problems that had occupied him during the years in which he was at work on the First and Second Systems and the subsequent complex problems that emerged out of this intensive period of work. With this work behind him providing his new starting point, however, the next step for Peirce in the direction of generalising the insights obtained thus far would be to, in his own words above "...proceed to the study of what the problem of philosophy consists in, and of the proper way of solving it." At this stage Peirce was becoming increasingly convinced that formal logic *per se* could not afford as solid a basis for knowledge as both Kant and he had assumed, and this is, in Murphey's view, the reason why his final classification of the sciences differs considerably from its predecessors in actually separating the theory of the categories from logic. It also seems clear that this is why Peirce's discussions of logic in general, and of its three subdivisions were given such a prominent position as they were - recall that in all twenty four memoirs (Memoirs 9-33) out

of a total of thirty six were devoted to precisely these issues – in Peirce’s Carnegie application of 1902. And indeed, the year 1902 is in fact a kind of turning point in this particular respect. Indeed, Murphey notes in this connection that Peirce’s answer to the rhetorical question posed above: “If the categories are true of all thought, they are true of the special sciences by definition – why bother to prove in detail what is obvious a priori?” was very unclear in the *Monist* papers, which as we will recall, were all written between 1891 and 1893, and did not actually begin to become clear for him until around 1902.

In order to understand better why this may be the case it is necessary to understand Peirce’s way of working. His belief in the architectonic theory of philosophy was probably the strongest and most long-lasting inheritance of his early commitment to Kant during what Murphey refers to as Peirce’s “Kantian phase based on Kantian logic” (from 1857-1866), which Peirce later moved on from to develop his own system. Kant had previously defined the idea of “architectonic” in his “Critique of Pure Reason” as follows:

“By an architectonic I understand the art of constructing systems. As systemic unity is what first raises ordinary knowledge to the rank of science, that is, makes a system out of a mere aggregate of knowledge, architectonic is the doctrine of the scientific in our knowledge, and necessarily forms part of the doctrine of method.

... By a system I understand the unity of the manifold modes of knowledge under one idea. This idea is a concept provided by reason – of the form of the whole – in so far as the concept determines *a priori* not only the scope of its manifold content, but also the positions which the parts occupy relatively to one another. The scientific concept of reason contains, therefore, the end and the form of that whole which is congruent with this requirement. The unity of the end to which all the parts relate and the idea of which they all stand in relation to one another, makes it possible for us to determine from our knowledge of the other parts whether any part be missing, and to prevent any arbitrary addition, or in respect to its completeness any indeterminateness that does not conform to the limits which are thus determined *a priori*. The whole is thus an organised unity (*articulatio*), and not an aggregate (*coacervatio*). It may grow from within (*per appositionem*). It is thus like an animal body, the growth of which is not by addition of a new member, but by the rendering of each member, without change of proportion, stronger and more effective for its purposes.” [A832f B860f]<sup>17</sup>

Kant held that the basis of architectonic structure lay in formal logic. Peirce adopted initially both Kant’s concept of system and his particular view of the role of logic in such systems, although he later became convinced, with regard to what he referred to as “the correspondences between the functions of judgement and the categories” in Kant’s system, that “Its defect is that it affords no warrant for the correctness of the preliminary table, and does not display that direct reference to the unity of consistency which alone gives validity to the categories.” [D2p1, cited in Murphey 1993, p. 56] Murphey goes on to maintain that although this important critical insight, which Peirce probably developed sometime in the period between 1862-1863, was the main motivating factor that started him upon his systematic studies of logic in general, it was nonetheless his basic belief in the two fundamental ideas of system as architectonic and the role of logic in such a system that constitutes the governing principle behind the development of his own philosophical system.

---

<sup>17</sup> Cited in Murphey 1993, p. 2. See the reference list at the end of this essay for a description of the various citation systems adopted here for references to Kant’s works.

Indeed, this appears almost certainly to be the case, as is witnessed by the following passage taken from the final version of Section 1 in his Carnegie application, where Peirce writes:

“Owing to my treating logic as a science, like the physical sciences in which I had been trained, and making my studies special, minute, exact, and checked by experience, and owing to the fact that logic had seldom before been so studied, discoveries poured in upon me in such a flood as to be embarrassing. This has been one reason why I have hitherto published but a few fragments of outlying parts of my work, or slight sketches of more important parts. For logic differs from the natural sciences and, in some measure, even from mathematics, in being more essentially systematic. Consequently, if new discoveries were made in the course of writing a paper, they would be apt to call for a remodelling of it, a work for mature reconsideration. Still, as far as I remember, no definitive conclusion of importance to which I have ever been led has required retraction, such were the advantages of the scientific methods of study. Modification in details and changes (very sparse) of the relative importance of principles are the greatest alterations I have ever been led to make. Even those have been due, not to the fault of the scientific method, but chiefly to my adherence to early teachings.” [MS L75 FV 346-349]

Hence, since Peirce believed consistently in the basic idea of an architectonic system, he worked continuously to develop his system of philosophy and his logical method in such a way for the whole of his productive scientific life, and he seemed to have in his mind at all times a quite clear and definite conception of such an all-encompassing philosophical system, even though his understandings of what such a system might necessarily need to involve, for instance in terms of ontological systemics, came to change somewhat over time.

### **Peirce’s method of philosophical inquiry**

Peirce’s method of philosophical inquiry was, then, basically “scientifically” or “empirically” oriented, in the sense that he would first begin by formulating in writing the particular position he found himself holding at any given time as systematically and completely as possible. Having done so, he would submit this particular position to hard and uncompromising criticism, and when he discovered certain unsolved problems within it, he would proceed to solve these bit by bit - working at such times from the bottom-up, so to say. During these “bottom-up processing” periods of his wider philosophical endeavour he would pay little or no attention to the remainder of the system, or to the system as a whole, and only return to these again after he considered that the more specific problems which he had been working on had been solved in a satisfactory way for the time being. Then, and only then, would he begin on a revision of the whole system in order to try and take account of these new findings. In Murphey’s account (which I am inclined to evaluate as probably the most soundly historically grounded and thoroughly documented portrayal of Peirce’s philosophical development available to date) it is Peirce’s logic that the whole of his architectonic order is built upon, and it is thus this logic that provides the creative and dynamic element in the further development of his philosophy. From this it follows that with each major discovery that Peirce made in his logic, then some major reformulation of his philosophy should be seen to have taken place. This is what in fact seems to be the case. Murphey writes in this connection:

“Peirce’s Philosophy went through four major phases. The first extended from the earliest of his papers which we have, dated 1857, until 1865 or 1866, and was very much a Kantian phase based on Kantian logic. The second began with the irreducibility of the three syllogistic figures in 1866 and extended until 1869 or 1870. The third was inaugurated by the discovery of the logic of relations and continued until 1884. And the last stemmed from the discovery of quantification and of set theory and continued until his death. (Murphey 1993, p. 3)

He goes on to point out that Peirce himself did not consider these different phases as constituting work on different systems, but regarded them rather as part of a constant process of revision of a single over-all architectonic system. After each revision Peirce preserves as much of the preceding system as possible, and only tinkers with those particular doctrines that had come into conflict with conclusions he had drawn from his new logical investigations, or which proved unsatisfactory on other grounds. Generally Peirce tended to maintain the terminology and over-all outline of his system, even in cases where the doctrines had been radically altered. I think it is reasonable, too, to assume in this connection that he did not make terminological changes unless he had some quite specific reason for doing so.

This point of view seems somewhat in conflict with a number of other commentators, who often tend to refer to Peirce’s habit of coining new terms as more of an irritation than a deliberate intellectual or philosophical strategy on his side. Winfried Nöth, in a brief presentation of Peirce’s philosophy in his comprehensive “Handbook of Semiotics” (Nöth 1990, pp. 39-47) notes for instance that “In his definition of the sign, Peirce introduced an idiosyncratic and changing terminology that has been adopted by few of his followers” (ibid., p. 42). Liszka (1996, p. ix) too, comments for example in the preface to his book that “Peirce also has an annoying habit of neologizing, which is compounded by the fact that he also gives several names to the same concept.” And indeed, this particular issue has frequently been a source of discussion within the wider Peirce research community over the years, as Nöth also points out: “...there have been many terminological changes in the numerous papers on semiotic topics which Peirce produced during the half century of his semiotic research, and these changes have often raised questions of whether they also involve a change of theory (cf. Weiss & Burks 1945: 383)” (ibid., p. 40).

My opinion on this matter, which I believe I also share to some degree with both Murphey and Ransdell, is that Peirce in many, if not most, cases quite consciously adopted the two strategies outlined by Liszka above (i.e. neologizing and use of multiple terms for more or less the same idea) as a means of focusing on, and thus casting new light upon, some central and problematic area or other in his basic system. His frequent creation of neologisms and the use of multiple terms for what can often appear to be the same basic concept (which in Peircean terms could be considered as already complex interpretants on the verge of some further development whereby they would be able to function as new signs) can then be seen more as a kind of philosophical tool for “making strange” or challenging his own current conceptions of the problem in hand, and thus opening up for the possibility of new avenues of investigation around the problem. Some classical examples of this are the relationship between Peirce’s use of the terms “Representamen” and “Sign”, and the proliferation of terms he used at various times in his discussions of the concept of “Abduction”, such as “Retroduction”, “Hypothesis”, “Retrductive Inference” etc..<sup>18</sup>

---

<sup>18</sup> Ransdell comments in this connection that: “... Peirce has a marvellous ability to redescribe the same subject-matter from a seemingly endless number of different points of view, so that the moves made from a given description of something can

Since the publication of the full chronological edition of Peirce's writings (see under "Writings of Charles Sanders Peirce" in the literature reference section of this essay for more details on this project) is still at a quite nascent stage of development (as yet there have only been published 5 of 30 proposed volumes), further investigation in any great depth of this particular issue of exactly why, when and how Peirce might have used this particular technique must be considered merely an interesting empirical and interpretational project for the future. I shall nonetheless come back briefly to this issue in conjunction with Peirce's choice of terms for the representation of his three orders of his logic a bit later on in this essay.

## On terms and the Classification of the Sciences in the memoirs

In Memoir 1 (MS L75, 350-357): On The Classification Of The Theoretic Sciences Of Research Peirce sets down in tabular form his basic classification of the sciences - of which a substantial part forms the conceptual basis for the 36 Memoirs that make up the appendix to his application - as follows<sup>19</sup>:

### CLASSIFICATION OF THE SCIENCES

#### A. Theoretical Science

##### I. Science of Research

- i. Mathematics
- ii. Philosophy, or Cenoscopy

##### 1. Categorics [= phenomenology]

##### 2. Normative Science

- a. Esthetics
- b. Ethics
- c. Logic [= semiotic]
  - [philosophical grammar]
  - [critical logic]
  - [philosophical rhetoric]

##### 3. Metaphysics

##### iii. Idioscopy, or Special Science

- 1. Psychognosy
  - a. Nomological or General Psychology

---

lead in quite different directions than those made from a different description of the same thing. Thus there must be, I would guess, something like two hundred verbally different formulations of the generic representation relation, some of which differ only in a relatively insignificant respect, some of which, however, seem at first quite unlike the others and can lead in importantly different directions." (Ransdell 1994, p. 7), and he goes on to note too (in a footnote) that: "This is why it seems to people who read Peirce superficially that he is forever changing his mind, when in fact he is just taking another look at the same thing or heading in a different direction from it. Real things have innumerable true descriptions – it is the mark of a merely fictitious or made up entity that it is only what it is described as being – and there is no reason to suppose a priori that when we are attempting to describe the "essential" – that is, the most cognitively important – aspects of something real that we should be able to capture that in a single perfect description. Reality has facets." (ibid. p. 7 footnote)

<sup>19</sup> Additions in square brackets [...] in the table have been added in the transcribed text-version of MS L75 by Ransdell for purposes of clarification.

- b. Classificatory
  - a. Linguistics
  - b. Critics
  - c. Ethnology
- c. Descriptive
  - a. Biography
  - b. History
  - c. Archaeology

## 2. Physiognosy

- a. Nomological or General Physics
  - a. Dynamics
    - 1. Of particles
    - 2. Of aggregations
      - a. Elaterics and Thermotics
      - b. Optics and Electrics
- b. Classificatory
  - a. Crystallography
  - b. Chemistry
  - c. Biology
- c. Descriptive
  - a. Astronomy
  - b. Geognosy

## II. Science of Review, or Synthetic Philosophy [Humboldt's "Cosmos"; Comte's "Philosophie Positive"]

### B. Practical Science, or the Arts

From the above, it seems quite clear that Peirce intended the 36 Memoirs to offer a rather detailed working out of the first section of his classification of what he referred to as Theoretical Science, namely The Science of Research. If we include the references to the subdivisions of mathematics from Litzka's version, as well as the three subdivisions of Metaphysics mentioned by Murphey (1995, p. 366), this would be as follows:

### A. Theoretical Science

#### I. Science of Research

- i. Mathematics
  - a. Of Logic
  - b. Of Discrete Series
  - c. Of Continua
- ii. Philosophy, or Cenoscropy
  - 1. Categorics [= phenomenology]
  - 2. Normative Science
    - a. Esthetics
    - b. Ethics
    - c. Logic [= semiotic]
      - [philosophical grammar]
      - [critical logic]
      - [philosophical rhetoric]
- 3. Metaphysics
  - a. Ontology
  - b. Religious Metaphysics
  - c. Physical Metaphysics

We note at this point that in the diagrammatic version of the scheme of the sciences provided in Liszka (1996, p. 4, Fig. 1) there are certain differences in the labelling of components in this part of the table. “Theoretical Science” is for instance labelled “The Formal Sciences”, while “Categorics” is labelled “Phenomenology”. Liszka has also opted to use other terms than those which Ransdell has inserted in square brackets above for the first and last of the three subdivisions of Logic (or Semeiotic), namely “(Semeiotic) Grammar” and “Universal Rhetoric”. In his view whatever choice of terminology one might make today for the representation of Peirce’s various conceptions of the orders of logic is not particularly important, as he makes clear in the passage cited below:

“Semeiotic is a normative science which is an order within the class of philosophic sciences. As a normative science it is concerned with the first of the primary values truth, goodness, beauty. But according to Peirce, it is concerned with the truth in three regards, which define three branches of the discipline (CP 1.191): the study of the sign’s grammar, logic and rhetoric. This parallels the classical trivium in liberal studies, although of course with reference to the sign. Grammar is the study of the formal features of the sign and its modes of expression; logic is concerned with the manner in which signs can be used to discern truth; while rhetoric is the investigation into the manner in which signs are used to communicate and express claims within a community. These studies are variously named by Peirce, but the preferred usages here will be *semeiotic grammar*, *critical logic*, and *universal rhetoric*. These divisions are probably more familiar to many readers under Charles Morris’s nomenclature: syntax or syntactics, semantics and pragmatics.” (Liszka 1996, pp. 9-10)

Max Fisch (1978) has, however, documented elsewhere that Peirce’s usage of various terminological variants was actually ordered chronologically in a fairly systematic way as shown in the following table<sup>20</sup>:

Spring 1865	Universal Grammar	Logic	Universal Rhetoric
May 1865	General Grammar	General Logic	General Rhetoric
1867	Formal Grammar	Logic	Formal Rhetoric
1897	Pure Grammar	Logic Proper	Pure Rhetoric
1903	Speculative Grammar	Critic	Methodeutic

Of Liszka’s three preferred usages above, ‘semeiotic grammar’, ‘critical logic’, and ‘universal rhetoric’, only ‘universal rhetoric’ actually appears in Fisch’s overview of Peirce’s own terms above. Similarly, Ransdell’s choice of alternative terms: ‘philosophical grammar’, ‘critical logic’ and ‘philosophical rhetoric’ are not to be found there either.<sup>21</sup>

Both Ransdell and Liszka are however in their accounts in this particular respect largely concerned with the important task of showing how different aspects of Peirce’s philosophy fit into a framework of contemporary conceptualisations - a project which is valuable since it illustrates in a functional way the powerful influence that Peirce’s thinking has exerted on the

<sup>20</sup> Cited in Liszka 1996, p. 109.

<sup>21</sup> This does not of course preclude that Peirce may actually have used them at some stage. Ransdell comments for instance in an editorial note to one of the memoirs that: “[o]ther Peircean terms for ‘stechiology’ (or ‘stechiologic’) are e.g. ‘universal grammar’, ‘speculative grammar’, and ‘philosophical grammar’. ‘Critic’ is usually referred to as ‘critical logic’ or simply as ‘logic’ (in what he calls ‘the narrow sense’, in distinction from the broad sense in which it is equivalent to ‘semeiotic’). ‘Methodeutic’ is also ‘universal rhetoric’, ‘speculative rhetoric’, and ‘philosophical rhetoric’.” [Note to Memoir 13 FV (364-365)]

subsequent development of contemporary theories of meaning in general and the philosophy of language more specifically. Since we are for the moment concerned with the historical development of Peirce's thinking seen in relation to his use of terms, we shall continue to concentrate on those that he actually uses in his Carnegie application, these being seen in relation to the five triads of terms mentioned in Max Fisch's list above.

If we go on to look more closely at the chronological overview provided by Fisch above, we can see that the variations in the usages of different terms to represent the orders of semeiotic in the course of Peirce's career clearly does seem to mirror the steady development and reworking of Peirce's semeiotic over time. This close relationship between the actual technical terminology chosen by Peirce and the changing configurations of systemic meanings associated with the wide referential scope of these terms is hardly surprising, given Peirce's close and consistent attention to questions of the ethics of terminology throughout his life. He wrote for example as early as March 1862 that:

“By his system of nomenclature, Sir William Hamilton has conferred an immense boon not alone on his own school but on all English philosophers who believe in anchoring words to fixed meanings. I deeply regret this and am not one of these. That is the best way to be stationary, no doubt. But nevertheless I believe in mooring our words by applications and letting them change their meaning as our conceptions of the things to which we have applied them progress.” (WI: 58, cited in Daube-Schackat 1996, p. 383)

Forty one years later, in 1903 (we might note in passing too, that this is also the year after the Carnegie Institute application was submitted), Peirce wrote an article entitled “Ethics of Terminology” (see Weinsheimer 1996 for a recent discussion of this in relation to hermeneutic semiotics; and an earlier, thorough discussion of the “Ethics” in Ketner 1981), where he stated in the course of an attempted exegesis of the problem of exactitude:

“For every symbol is a living thing, in a very strict sense that is no figure of speech. The body of the symbol changes slowly, but the meaning inevitably grows, incorporates new elements and throws off old ones” (CP 2.222, cited in Daube-Schackat 1996, p. 383.)<sup>22</sup>

The thesis of progression and development of the architectonic as reflected in the changing terminology used by Peirce for the expression of the three orders of logic above becomes even more clearly delineated if we move on to examine even more closely Murphey's historical exegesis of the development of Peirce's thought (Murphey 1993, p. 3), which he divides as we will remember into four main developmental phases:

- 1) from 1857-1865 or 1866, (“the Kantian phase, based on Kantian logic”)
- 2) from 1866-1869 or 1870 (after the discovery of the irreducibility of the three syllogistic figures)
- 3) from 1870-1884 (after the discovery of the logic of relations)
- 4) 1884 - 1914 (after the discovery of quantification and of set theory)

---

<sup>22</sup> Note here too, the similarity between Peirce's characterisation of the symbol as “a living thing”, and Kant's characterisation of architectonic in “Critique of Pure Reason” cited previously: “The whole is thus an organized unity (*articulatio*), and not an aggregate (*coacervatio*). It may grow from within (*per appositionem*). It is thus like an animal body, the growth of which is not by addition of a new member, but by the rendering of each member, without change of proportion, stronger and more effective for its purposes.” [A832f B860f]

The two first triads of terms in Fisch’s (1973) overview, namely: ‘Universal Grammar’, ‘Logic’ and ‘Universal Rhetoric’ and ‘General Grammar’, ‘General Logic’ and ‘General Rhetoric’, from Spring 1865 and May 1865 respectively, all had their origins then, in Peirce’s “Kantian phase” (1857-1865 (or 1866)), whereas the third triad: ‘Formal Grammar’, ‘Logic’ and ‘Formal Rhetoric’ from 1867, belongs to the phase after his discovery of the irreducibility of the three syllogistic figures (1866-1869 (or 1870)), and the fourth and fifth triads: ‘Pure Grammar’, ‘Logic Proper’ and ‘Pure Rhetoric’ from 1897, and ‘Speculative Grammar’, ‘Critic’ and ‘Methodetic’ from 1903, belong to the final period (1884-1914), i.e. after Peirce’s discovery of quantification and set theory. Put into tabular form this would be as follows:

Developmental phase	Period	Terminology for the Semeiotic		
		Universal Grammar	Logic	Universal Rhetoric
“Kantian” phase	1857-1865 (or 1866)	General Grammar	General Logic	General Rhetoric
After discovery of the irreducibility of the three syllogistic figures	1866-1869 (or 1870)	Formal Grammar	Logic	Formal Rhetoric
After discovery of the logic of relations	1870-1884			
After discovery of quantification and set theory	1884 - 1914	Pure Grammar Speculative Grammar	Logic Proper Critic	Pure Rhetoric Methodetic

We shall now go on to look at this in more specifically in systemic developmental terms – i.e. placing the terminological shifts more closely into relation with Peirce’s development of his architectonic through a process of philosophical inquiry where revisions are steadily being made over time as external exigencies and theoretical discoveries made the need for this apparent. In the following rather compact review of the general development of Peirce’s philosophical system, I have chosen to follow fairly closely Murphey’s sequencing of the four developmental phases mentioned above, and to some extent also his discussions of these, interspersing the whole with my own comments and interpretations, especially in relation to possible correlations between changes in Peirce’s basic conceptual framework and the various terminological changes he made in the designation of his central three disciplines of semeiotic that were briefly presented above.

### **The Kantian phase: the First System and origins of the Second System**

The First System was essentially an attempt to build a system of metaphysics, which Peirce defined as “the philosophy of primal truths” and the logical “analysis of conceptions”<sup>23</sup>. Peirce first began studying Kant’s “Critique of Pure Reason” in 1855, at the age of about sixteen, and became an enthusiastic disciple from the very beginning of his philosophical

---

<sup>23</sup> These two definitions are to be found in an unpublished manuscript, August 21, 1861, IBs, Box 8, entitled “Principles”. Cited in Murphey 1993, p. 21.

career. He later wrote that “I was a passionate devotee of Kant, at least as regards the Transcendental Analytic in the *Critic of the Pure Reason*. I believed more implicitly in the tables of Judgement and the Categories than if they had been brought down from Sinai” [CP 4.2]. However, he soon became convinced that it would be necessary to make a revision of these, mainly based on the insight that the relations between the categories could be properly expressed in a rather more general way. He noted in a paper written in 1859<sup>24</sup> that the twelve categories may actually be grouped into four classes of three each, and since these classes are more general than the twelve categories, it is these classes, which Peirce went on to rename as ‘Thing’, ‘Quality’, ‘Dependence’ and ‘Fact’, which should in fact be considered the more fundamental, and thus, the categories. In doing so, he also introduced the concept of three developmental stages, which he denoted ‘Simplicity’, ‘Positivity’ and ‘Perfection’ within each of the new categories.

At the same time, he was pondering how to incorporate into his theory the basic insight that he had gained from his earlier readings of *Kant’s Critique of Pure Reason*, that every cognition involves an inference. For Kant there can be no cognitions until the manifold of sense has been brought to unity, and in Peirce’s view this reduction can only be brought about by introducing a concept which itself is not a sensuous intuition. This necessitates that every cognition requires some operation upon the manifold to bring it to unity, and Peirce goes on in his theory of judgement to define any operation that takes place on “some information” (i.e. the manifold of sense impressions) which results in a cognition as an *inference*.

“Every judgement consists in referring a predicate to a subject. The predicate is thought, and the subject is only thought-of. The elements of the predicate are experiences or representations of experience. The subject is never experienced but only assumed. Every judgement, therefore, being a reference of the experienced or known to the assumed or unknown, is an explanation of a phenomenon by hypothesis, and is in fact an inference. Hence there is a major premiss behind every judgement, and the first principles are logically antecedent to all science, which I call *a priori*.”<sup>25</sup>

Peirce goes on to argue that this means in logical terms that the fact that the original major premiss of any syllogism of the type Barbara, which he at this time believed all types of syllogisms could be reduced to, cannot come from experience, but must be given in some way prior to this. It is only minor premisses that can be given by nature in experience. The question is then: where do our original major premisses (or “primal truths”) come from? If we make a negative judgement in the form of a proposition such as “this is not green”, this cannot be an example of what Peirce calls “unreasoned-upon experience” – experience without prior precedent – since this cognition obviously refers to something known already to the speaker as “green”, which the particular experience giving rise to the negative judgement above could not possibly provide. In the same way, unreasoned-upon experience cannot either be universal.

“It is only minor premisses, then, that nature affords us; for all Universal, Negative, Unconditional and Necessary Truths exist and *have their truth in the mind*. They are true without proof, can have but one basis and must be independent of nature.” [Pr. 15f, cited in Murphey 1993, p. 22]

---

<sup>24</sup> From “New Names and Symbols for Kant’s Categories”, May 21, 1859, 1B Box 8. Cited in Murphey 1993, p. 34-35

<sup>25</sup> From “A Treatise of the Major Premises of Natural Sciences”, fragment. Cited in Murphey 1993, p. 21

At this point in time, Peirce did not believe that the truth of the axioms or “primal truths” is something that can be demonstrated or proved logically – as a consequence he considered that one can only accept them on the basis of faith. In Kantian terms, these are synthetic a priori statements, the truth of which Kant attempted to solve in his *Critique of Pure Reason*, but Peirce could not accept Kant’s proof on this point, but he did not either seem satisfied with the notion that the truth of the universal axioms, or major premisses - his “primal truths” - must be accepted purely on the basis of faith alone. But since it seemed impossible to inquire at all into the truth of the premisses, then this meant that metaphysics would have to be limited to inquiry into the logical analysis of concepts or ideas - logic must in other words be the key to any ontology. The important distinction Peirce makes in this connection is between the “potentially thought” and the “potentially thought-of”: between what is capable of being a sign, and that which is capable of being the object of a sign. Kant’s theory of the Transcendental object had implied that there must be two kinds of entities that can be objects of representation: thoughts themselves which can be thought of, and the “things in themselves”, which as Kant had pointed out “cannot itself be intuited by us” [A108f]. When something is thought of, this is through its properties, undiscriminated from the thing. For us to become aware of our thoughts, we must subsequently make an abstraction. Peirce however proposed that the process of abstraction could be carried a step further, and that since thought is not a thing, it cannot be merely personal, but rather pure form, which cannot belong to any particular time, space or person.

“A thought is not a thing. Several things may have some quality in common. That is a thought. All the consciousnesses which contain this thought also have the thought of which they are only expressions. Thought therefore is not personal. But pure form.

Thing  
Feeling  
Pure Form”<sup>26</sup>

No abstraction can in itself therefore ever be fully realised in human consciousness, only instances (i.e. “expressions”) of an abstraction.<sup>27</sup>

In order to cope with the problem of how we can have knowledge of abstractions if they are not in mind. Peirce proposes that there are two types of conceptions that we cannot think, although we can think *about* them. He writes in a discussion of why we can reason about the infinite, even though we cannot analyse or otherwise really understand it as an abstraction:

“ Pseudo-conceptions or conceptions that we cannot think are of two kinds. The first is where the conceptions into which we analyse the pseudo-conception in definition refuse to be combined and are contradictory. And I will in another place give a *formal* proof that such conceptions represent no thing and are not had.

---

<sup>26</sup> “On Classification”, fragment, p. 1, 1B2 Box 2 (Alternative version of “Principles”, probably 1861). Cited in Murphey 1993, p. 29.

<sup>27</sup> Interestingly, this distinction between abstractions and expressions of abstractions is probably the beginnings of the distinction Peirce later was to make between legisign and sinisign (or alternatively, type and token), but these actual concepts did not emerge however in his writings until considerably later on, probably around 1903. (See for instance CP 2.243-52 and 2.254-65)

The second case is where the elementary conceptions do not refuse to be combined, but where our power of synthesizing is inadequate and the combination can never be completed.”<sup>28</sup>

If the “synthesizing” in case two above cannot be completed (Kant’s “bringing of the manifold to unity”), then there cannot be an effect on the mind in the form of a conscious idea. This means that the mind must be able to cope with ideas that are not brought into consciousness: we can think of them, but we do not need to be able to think them. The problem then is how to know whether these ideas are true or not. Peirce’s solution is to say that the “normal way of thinking” yields true statements, which presumes that every statement is true unless it contradicts some other, even meaningless statements. Thus “what is unintelligible is true” if it contradicts nothing else.

This analysis of conceptions provided Peirce with three classes of entities: the thing thought of, the thought and the abstraction. It was these three classes, the enumeration of which he held to be complete, that were to form the basic foundation of his triadic system of logic.

### **Discovery of the irreducibility of the three syllogistic figures**

From his studies of Aristotle and the Scholastics, which in turn had originally been prompted by his conviction that the correctness of Kant’s table of functions of judgement could not be guaranteed, Peirce arrived finally at the conclusion that the most important object of study for logic was not the forms of the proposition, but rather, the syllogisms themselves. His reasoning was that since the only differences among the propositions that are logically significant are those which affect their role as components of syllogisms, then the study of the syllogisms should precede that of the propositions. Kant had of course in the *Transcendental Dialectic* of his “*Critique of Pure Reason*” drawn a different conclusion from Peirce with regard to the nature of the syllogisms, namely that there were actually three types of dialectical syllogism, distinguished from one another by the forms of their propositions. (the categorical, the hypothetical and the disjunctive). The universality and necessity of the categories for Kant rest, then, upon the universality and necessity of the forms of the propositions, which in turn rest upon the dual assertion that all thought is in propositions, and that the classification of the propositions is correct. Peirce’s proposal was on the other hand that if the significance of propositional form depends on its use in inference, then the correctness of this classification depends on the further premisses that all thought is inference (rather than in propositions), and that these particular forms are necessary for thought, considered as inference, which led him naturally enough to re-examine the issue of the classification of the syllogisms.

At this time, Peirce had, as mentioned previously, adopted the position, based largely on his somewhat loose interpretation of Kant’s prior discussion of this in “*Die falsche Spitzfindigkeit der vier Syllogistischen Figuren*”<sup>29</sup>, that all forms of inference, including hypothesis, could be reduced to the first of the four syllogistic figures, i.e. Barbara<sup>30</sup>. Peirce

---

<sup>28</sup> “Why We Can Reason on the Infinite”, October 1859, 1B2 Box 8. Cited in Murphey 1993, p. 30.

<sup>29</sup> Immanuel Kant (1762), in Buchenau (ed.), 1912, *Immanuel Kant Werke*, Berlin, II, 49-65. Referred to and discussed in Murphey 1993 (1961), p. 57.

<sup>30</sup> Syllogism of the first-figure form:

went on to develop this idea further and he explained it, probably sometime around the middle of 1865, in the following fashion:

“Every syllogism can be put into a hypothetical form thus:

Y is X		If Y then X
Z is Y	becomes	but Y (under Z)
Z is X		Therefore X
		(under Z)”

Where (under Z) Peirce meant that under the hypothesis that Z is true, that is: that Y would be true if Z is. Since X as *modus ponens* will be assertable if Y is, and since Y is true if Z is, then X is true if Z is.

Here, Peirce is, then, emphasising the hypothetical form of the *modus ponens*. Murphey points out that it is clear that he had not yet discovered that the three figures of the syllogism could be correlated with the methods of deduction, induction and hypothesis (or “abduction”, as he later went on to refer to it). This did not come until later. Thus, at the beginning of 1866, Peirce began on a detailed analysis of Kant’s article on “Die falsche Spitzfindigkeit...”, and of the relations between the three syllogistic figures, and actually succeeded in proving that each of the three figures involves an independent principle of inference. Even though all syllogisms of the second and third figures may in principle be reduced to the first, the argument for making this reduction must in any case be made in the figure from which it is being reduced: “Hence it is proved that every figure involves the principle of the first figure, but the second and third figures involve other principles besides” [CP 2.807] In reaching this conclusion he had been influenced by his reading of Boole’s “An Investigation of the Laws of Thought”. At the same time he also concluded significantly that “There is no difference logically between hypotheticals and categoricals. The subject is a sign of the predicate, the antecedent of the consequent; and this is the only point that concerns logic.”<sup>31</sup> This substitution of the sign relation for causality as the most basic relation between subject and predicate in the proposition, represents, again according to Murphey, one of the most fundamental advances that Peirce made in this period. The three forms of inference may well be distinct, but if the causal relationship between subject and predicate may be reduced to a sign relation, then this relation must be the most basic form of thought upon which one must build any system of categories.

### A New List of the Categories

In May 1867, Peirce published “On A New List Of The Categories”<sup>32</sup> - in itself a highly compact, and in many ways doctrinal piece of writing - which was basically a summing up of

---

All M is P	(P belongs to all M)
All S is M	(M belongs to all S)
∴ all S is P	(therefore P belongs to all S)

where S is the minor term, P the major term and M the middle term.

<sup>31</sup> “Logic: 1865-1867”

<sup>32</sup> Murphey notes that four draft versions of this paper remain, and his discussion of how the central themes that make up the main content of the final version are developed and reworked in the course of the four drafts makes fascinating and interesting reading (see Murphey 1993, pp. 64-94), but for the sake of brevity we shall not draw in the four drafts in our

the previous ten years work on the categories carried out between 1857 and 1867. The “New List” consists of fifteen sections, labelled by Peirce as such, and each representing separate stages of his attempt to validate what he describes as a theory based on “a conception of graduation among those conceptions which are universal” [CP 1.546] from which are to be derived “the most fundamental ones [...] in the sphere of logic” [CP 1.558], with his argumentation being based on the already established idea that “the function of conceptions is to reduce the manifold of sensuous impressions to unity.” [CP 1.545]

It is here for the first time that Peirce introduces the idea of the interpretant in a coherent context of the triadic sign relation. In this particular paper, Peirce does not seem to make any distinction, which Kant of course had done, between analytic and synthetic unity. Murphey attributes this largely to the fact that he was working on his theory of cognition (which was published a year or so later) at more or less the same time as he produced “The New List”, and that in his working out of this theory, Peirce had taken the position of arguing strongly against the notion of intuitions (or “ultimate premisses”, as he also referred to these), which, in the view presented in this theory, could not be proved to exist since all concepts are determined by some prior cognitions. The Kantian distinction between synthetic and analytic unity had therefore to be left undiscussed in the “New List” in order for the theory of the categories to be, as Peirce had proposed, one of the key parts of his theory of cognition. So when Peirce refers to “the manifold of sensuous impressions” in the “New List”, he is therefore using this term in a very restricted sense to mean, in Murphey’s reading (Murphey 1993, p. 69) of this, “something very close to the set of all nerve excitations at a given time”, rather than in Kant’s considerably wider sense of the term.

This particular point is rather important because in the “New List”, Peirce first develops a fundamental distinction between “being” and “substance”, where the latter is derived from the idea of “the present in general”, this being a somehow non-unified concept, in the following way:

“... the conception of *what is present in general*, which is nothing but the general recognition of what is contained in attention, has no connotation, and therefore no proper unity. This conception of the present in general, of IT in general, is rendered in philosophical language by the word “substance” in one of its meanings. Before any comparison or discrimination can be made between what is present, what is present must have been recognized as such, as ‘it’, and subsequently the metaphysical parts which are recognized by abstraction are attributed to this ‘it’, but the ‘it’ cannot itself be made a predicate. This ‘it’ is thus neither predicated of a subject, nor in a subject, and accordingly is identical with the conception of substance.” [CP 1.547]

The “present in general” (the “manifold of substance”) is then not a synthesis of the manifold of impressions, but rather something which is conceptualisable but nonetheless prior to any kind of synthesis, and thus more akin to an “aggregation of elements”, to use Murphey’s

---

discussions here, but merely hold us to the final version. In this context it is however worth noting that, as Murphey also points out (*ibid.*, p. 106) that of the four drafts of the “New List”, one has no heading, two are entitled “Chapter I”, and one is entitled “Introduction”, implying that Peirce intended the “New List” to be an introduction to a more extended work on logic which was never actually completed. His subsequent publications from 1868 “Questions Concerning Certain Faculties Claimed for Man” [CP 5.318-357], “Some Consequences of Four Incapacities” [CP 5.264-317], and “Grounds of Validity of the Laws of Logic” [CP 5.318-357] were probably also thought as for inclusion in this volume, since they are developments of the doctrine of semiotic phenomenalism forwarded in “The New List”.

formulation (p. 72). This places it in Peirce's terms "nearest to sense". In the next section, the concept "being", which represents an opposite polarity in that it is considered to be "furthest from sense" is derived on the basis of the semantic role of the copula in simple propositions in the following way:

"Sec. 4. The unity to which the understanding reduces impressions is the unity of a proposition. This unity consists in the connection of the predicate with the subject; and, therefore, that which is implied in the copula, or the conception of 'being', is that which completes the work of conceptions of reducing the manifold to unity. The copula (or rather the verb which is copula in one of its senses) means either 'actually is' or 'would be', as in the two propositions, "There 'is' no griffin," and "A griffin 'is' a winged quadruped." The conception of 'being' contains only that junction of predicate to subject wherein these two verbs agree. The conception of being, therefore, plainly has no content."

Substance and being can then be taken to be "the beginning and end of all conception." [CP 1.548]. Since the conception of substance cannot "predicated of a subject, nor in a subject", and since the conception of being has no content, then the unity of a proposition must derive from the application of being to substance.

Through the method of abstraction (or in Peirce's terms "precision"), which is more closely defined by being seen in relation to "discrimination" and "dissociation" in section 5, Peirce begins to search out "whatever universal elementary conceptions there may be intermediate between the manifold of substance and the unity of being" [CP 1. 549] These he goes on to find to be "reference to a ground" ("Quality") which is "the first conception in order in passing from being to substance" [CP 1.551]; "reference to a correlate" ("Relation"), which cannot be abstracted from reference to a ground, but from which reference to a ground may be abstracted [CP 1. 552]; and "reference to an interpretant" ("Representation"), which cannot be abstracted from reference to a correlate, but from which reference to a correlate may be abstracted

The idea of reference to an interpretant is justified in the following way by Peirce in section 10:

"Reference to an interpretant is rendered possible and justified by that which renders possible and justifies comparison. But that is clearly the diversity of impressions. If we had but one impression, it would not require to be reduced to unity, and would therefore not need to be thought of as referred to an interpretant, and the conception of reference to an interpretant would not arise. But since there is a manifold of impressions, we have a feeling of complication or confusion, which leads us to differentiate this impression from that, and then, having been differentiated, they require to be brought to unity. Now they are not brought to unity until we conceive them together as being 'ours', that is, until we refer them to a conception as their interpretant. Thus, the reference to an interpretant arises upon the holding together of diverse impressions, and therefore it does not join a conception to the substance, as the other two references do, but unites directly the manifold of the substance itself. It is, therefore, the last conception in order in passing from being to substance." [CP 1.554]

The five categories thus arrived at are presented sequentially as follows:

“BEING Quality (Reference to a Ground), Relation (Reference to a Correlate), Representation (Reference to an Interpretant), SUBSTANCE

The three intermediate conceptions may be termed accidents.” [CP 1.555]<sup>33</sup>

From this Peirce goes on in section 13 to develop the ideas of Firstness, Secondness and Thirdness in the following way:

“Sec. 12. This passage from the many to the one is numerical. The conception of a ‘third’ is that of an object which is so related to two others, that one of these must be related to the other in the same way in which the third is related to that other. Now this coincides with the conception of an interpretant. An ‘other’ is plainly equivalent to a ‘correlate’. The conception of second differs from that of other, in implying the possibility of a third. In the same way, the conception of ‘self’ implies the possibility of an ‘other’. The ‘Ground’ is the self abstracted from the concreteness which implies the possibility of an other.” [CP1.556]

and he continues from this to section 14 where he makes a discussion of the relationship between these, his now fundamental categories, and three types of representations, which he later would develop into the three sign functions of icon, index and symbol:

“First. Those whose relation to their objects is a mere community in some quality, and these representations may be termed ‘Likenesses’.

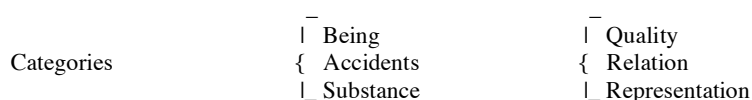
Second. Those whose relation to their objects consists in a correspondence in fact, and these may be termed ‘Indices’ or ‘Signs’.

Third. Those the ground of whose relation to their objects is an imputed character, which are the same as ‘general signs’, and these may be termed ‘Symbols’.” [CP 1.558]

In section 15 [CP 1.559], Peirce turns to a brief and now truly compact discussion of how, since the notions of reference to ground, object and interpretant can be considered fundamental to logic, here conceived of as a universal science, then such a science must have three interdependent but nonetheless distinct branches or areas of study, namely “formal grammar”, concerned with “the formal conditions of symbols having meaning, that is of the reference of symbols in general to their grounds or imputed characters”; “logic”, concerned with “the formal conditions of the truth of symbols”; and finally “formal rhetoric”, concerned with “the formal conditions of the force of symbols, or their power of appealing to a mind, that is, of their reference in general to interpretants”. These three “sciences” would also presuppose a general division of symbols into “terms”, “propositions” and “arguments”, which would be common for all three. In the case of arguments, the premisses form “a representation of the conclusion”, which may be in the form of a “likeness, index or symbol of the conclusion”, which further requires and justifies a division of arguments into three kinds: hypotheses (where “the premisses form a likeness of the conclusion”), inductive

---

<sup>33</sup> The nature of the interrelatness of the categories of Being, Substance and the three Accidents is perhaps more clearly discernible in Peirce’s diagrammatic formulation in Draft 4 of the “New List”:



(where “the premisses are an index of the conclusion”) and deductive (where “the conclusion is represented by the premisses as a general sign under which it is contained”). Finally, there is a reference to the distinction between extension and comprehension, based on the notions of denotation (“direct reference of a symbol to its objects”), connotation (“reference of a symbol to its ground, that is, its reference to the common characters of its objects”), and information (“its reference to its interpretants through its object, that is, its reference to all the synthetical propositions in which its objects in common are subject or predicate”). Since increments in the information value of a term are carried out by means of additions in the form of propositions to what it connotes or denotes, then extension and comprehension stand in an inverse relationship to one another, every increase in information being accompanied by an increase in either connotation or denotation.

If we return for a moment to our discussion of Peirce’s terminology, the “New List”, which is in many ways a central edifice in the transition from Peirce’s earlier “Kantian” phase to his more Berkeley-like semiotic phenomenalism (see Murphey 1993, p. 90 for a much more detailed discussion of this particular transition) treats of the derivation of universal conceptions or categories, while at the same time Peirce is actually making the first systematic declaration of a doctrine of a triadically based science of logic which is to be the foundation for the subsequent development of his architectonic. It therefore presents no great anomaly to find that he chooses to use the terms “formal grammar”, “logic” and “formal rhetoric” in this particular context in 1867.

Somewhat earlier, in an unpublished paper entitled “Grounds of Induction” Peirce had written on more or less the same theme that:

“As every symbol is determined in three ways, Symbols as such, are subject to three laws one of which is the condition sine qua no of its standing for anything, the second of translating anything, the third of its realizing anything. The first law is logic, the second Universal Rhetoric, and the third Universal Grammar”.

Peirce’s third set of terms for the “three laws” mentioned by Fisch as belonging to the earliest period of Peirce’s thought, namely: “General Grammar”, “General Logic” and “General Rhetoric” more likely than not made their appearance as a result of Peirce’s easy familiarity with Kant’s terminology, since the latter often equated general and universal concepts; with universality being associated with the highest possible level of generality. In this particular context it is in fact rather interesting to note that in the second draft of the “New List”, Peirce initially chooses to use the term “generalization” rather than the term “precision” (which he later goes on to form a preliminary definition of in the same draft) when he, for instance, writes:

“Reference to a ground i.e. possession of a character is not a conception given in the impressions of sense but is the result of generalization”. [D2 2]

and he also refers in the same draft to what was subsequently to become “substance” in the final version of the “New List” as “intuition in general” [D2 3]

Here, finally too, it is worth noting that in the fourth draft he chooses to introduce the notions of what he calls the “three phases” of the “general conceptions” as follows:

“Each of these three general conceptions reference to the ground, reference to the object and reference to the subject, has three phases Grammatical, Logical and Real, or as I prefer to say the Rhetorical” [D4 1]

### **Discovery of the Logic of Relatives**

In the years from 1867-1880 Peirce went on to develop the basic doctrine put forward in the “New List” into his New Theory of Cognition, (1867-1870), which again formed the basis for his Theory of Reality and his subsequent Theory of Inquiry which were developed in the years between 1871 and 1879. Of these three, the notion of Pragmatism associated with the Theory of Inquiry is probably the best known. Time and space constraints do not allow us at this juncture to go into the development of these three theories in detail, so for the moment we shall content ourselves with a few remarks on the philosophical transition precipitated by the integration of the newly discovered logic of relatives into Peirce’s second system which gave rise to the Theory of Inquiry, and thus to the Pragmatic Maxim, which provided the foundational basis for Peirce’s Pragmaticism.<sup>34</sup> In Murphey’s excellent account of this transitional period (see Murphey 1993, pp. 151-179) he makes the point that Peirce had read Augustus De Morgan’s innovative work “On the Syllogism IV and the Logic of Relations”<sup>35</sup> already six years after it had been published, in 1866. He had however not discerned all the possible implications of the discovery of relative propositions for his own work at that time, and it was not until 1869-70 that he began to work seriously with this emerging new area of logic<sup>36</sup>. Prior to this, his theory of logic had been based on the notion of the subject-predicate theory of propositions, but with the discovery of propositions not reducible to subject-predicate form, it is not clear if his prior theory would hold for these too. When such propositions are admitted, the notions of Substance and Being lose their universality, and this poses serious problems for Peirce’s original five category system. Peirce solved this problem by revising his concept of meaning. This was done by returning to the Scholastic notion of *habitualiter*, which allowed him to state that universals can exist in the mind as habits, allowing them to produce concepts without necessarily being able to become actualised in consciousness. The nature or principle of the operation of the thing, its essence, which Peirce regarded as the qualitative meaning of the concept of the thing, is then identified with the

---

<sup>34</sup> Although Peirce’s formulation of his Pragmatic Maxim was first published in 1878, he did not then refer to the term Pragmatism in any of his writings at this time. In fact, the notion of Pragmatism did become well-known before in 1898 when William James first used the term in a lecture given at the University of California, entitled “Philosophical Conceptions and Practical Results”. Peirce later declared himself dissatisfied by the utilitarian interpretation that James and others gave to the notion of Pragmatism, and he went so far as to coin a new term, “Pragmaticism” for his own doctrine, in the hope of making people aware of the distinction between the two. This term never really became popular, and Peirce is thus today in philosophical circles generally considered as first and foremost the originator of Pragmatism.

<sup>35</sup> Cambridge Philosophical Transactions, X, 341. This paper was first read publicly by De Morgan in April 1860.

<sup>36</sup> Around this time Peirce published a paper on logic entitled “Description of Notation for the Logic of Relatives”, and he began subsequently to consider how the implications of this new logic could be incorporated into his own philosophical system. Peirce’s own work on the development of the logic of relations, with De Morgan as his starting point is that which he is best known for in this particular field of science. In 1883 he published “The Logic of Relatives” in a collection of papers by himself and his students at Johns Hopkins University - “Studies in Logic by Members of the Johns Hopkins University”. In 1885 in “On the Algebra of Logic - A Contribution to the Philosophy of Notation” he interpreted propositional logic as a calculus of truth-values, and defined necessary truth as truth for all truth-value assignments to sentential letters. Peirce’s calculus of relations formed the basis of the Boole-Schröder algebra, which in turn formed much of the basis for Russell and Whitehead’s “Principia Mathematica” (1910-15, 3 volumes) which superseded it. He is thus considered, together with his student collaborator at Johns Hopkins in the 1880’s, Oscar H. Mitchell, and the German logician Gottlob Frege as one of the founders of quantification theory (see Audi (ed.) 1995, p. 567).

habits it involves. Thus, the real object can only be known as a regularity in phenomenal experience, and the concept of the object becomes translatable into a conjunction of conditional propositions, which are themselves general laws, or habits. This idea Peirce then proceeded to work into the Maxim of Pragmatism:

“Consider which effects, which might possibly have practical bearings, we conceive the object of our conception to have. Then our conception of these effects is the whole of our conception of the object” [CP 5.402]

Peirce’s Theory of Inquiry built upon the Pragmatic Maxim, as well as upon a theory of doubt and belief, formulated originally by the Scottish psychologist Alexander Bain, which defines belief as those opinions, or habits of mind, which are so strongly held as to cause us to be able to act upon them. Within this framework, which has a clear evolutionist flavour, doubt is seen as a kind of state of general irritation of the organism, caused by some surprising observation or other which in some way or other does not cohere with currently held beliefs, or for which we have no prior beliefs; and thus constituting a stimulus for a further process of inquiry which in the long run, and if it is pursued in a correct fashion, will eventually lead to a resolution of doubt, and a new state of belief. As is asserted by pragmatism, the concept of the object can mean nothing to us more than all the habits which it involves. The goal of inquiry is therefore, in this view, no more than attainment of stable beliefs, i.e. beliefs than can be shown to stand without becoming subject to doubt in the long run of evolution.

### **The Fixation of belief**

In “The Fixation of Belief” [CP 5.377f], first published in 1877, Peirce argues for the superiority of the “method of science”, contrasting this with three other historically established methods of fixing beliefs. These are: “The method of tenacity” (believing that which happens to suit us at the time and not being prepared to renounce it even in the face of conflicting evidence), “the method of authority” (institutionalisation of doctrines and subsequent elimination of dissenters), “the a priori method” (adopting those opinions which seem “agreeable to reason”). Building on his conception of the Real, developed earlier as part of his theory of reality, and now extending it to be taken as an ultimate premiss, Peirce argues for the need of a method of inquiry by which “our beliefs may be caused by nothing human, but by some external permanency – by something upon which our thinking has no effect” [CP 5.384] This optimal method is “the method of science,” the hypothesis of which is formulated by Peirce as follows:

“There are Real things, whose characters are entirely independent of our opinions about them; whose realities affect our senses according to regular laws, and, though our sensations are as different as our relations to the objects, yet, by taking advantage of the laws of perception, we can ascertain how things really are; and any man, if he have sufficient experience and reason enough about it, will be led to the one True conclusion” [CP 5.384]

Murphey (1993 p. 167-171) points out with reference to what Manley Thompson called “the paradox of Peirce’s realism”<sup>37</sup> that the problem with this formulation is that it actually

---

<sup>37</sup> In Weiner & Young (eds.) 1952, p. 138

presupposes that inquiry must go on for ever in order for reality to be guaranteed at all. Peirce is essentially defining reality in purely phenomenological terms, as the possibility of permanent sensation, while at the same time maintaining that the real object is something more than merely a regularity of sensation. If inquiry does not go on infinitely, something that cannot actually be proved to be the case since it is a projection of a hypothetical postulate to an infinite future, then no finite final opinion can ever be reached, and The Real becomes wholly an object of faith. Peirce however was content to leave this particular problem hanging in the air for a time, while he went on to revise his categories in accord with the new theory of meaning which he had developed as a result of the incorporation of the theoretical consequences evoked by discovery of the logic of relatives into his general philosophical scheme.

To this end, he abandoned the notions of Being and Substance, and instead developed further the concept of Thirdness - as the mediating representation or interpretant that brings things into relation - into the general relation that connects any two terms. He went on to try and show how Thirdness is the most important of the three categories since it corresponds to relation, and also that it was related to the notion of continuity - "the direct instrument of the finest generalizations" [CP 2.646]. The idea of continuity is in turn related to the notion of the infinitesimal, the reciprocal of the infinite, which at that time was considered an essential notion in calculus, and which constituted part of the origins of modern set theory<sup>38</sup>, discussions of which Peirce had already introduced around 1873 as an element in the development of his theory of cognition (and he in fact continued to defend the reality of the infinitesimals for the remainder of his life<sup>39</sup>). It was this notion of continuity and the associated extended notion of Thirdness which would form the basis of his later notion of Synechism, the development of which into his cosmology was in many respects one of the last important revisions of his philosophical system that he made.

Before we go on to discuss these matters further, mention should be made of Peirce's notion of community, which is central in his theory of inquiry, and also in some way related to the concept of continuity mentioned above. In "How to Make our Ideas Clear?", published in 1878. Peirce asks rhetorically: "in what does the reality of mind exist?", replying that

"We have seen that the content of consciousness, the entire phenomenal manifestation of mind, is a sign resulting from inference. Upon our principle, therefore, that the absolutely incognizable does not exist, so that the phenomenal manifestation of a substance is the substance, we must conclude that the mind is a sign developing according to the laws of inference" [CP 5.313]

This represents in one sense an expression of Peirce's belief in the idea of the divine mind, since in this context man's individuality only exists insofar as "his separate existence is manifested only by ignorance and error, so far as he is anything apart from his fellows, and from what he and they are to be, is only a negation" [CP 5.327].

The reference to "what he and they are to be", in this case implying some kind of ideal community, or merging of opinion, with the divine mind. Though individuality is solely

---

<sup>38</sup> The theory of infinitesimals has since been superseded in modern mathematics by the theory of limits.

<sup>39</sup> See Murphey 1993, pp. 238-288 for discussion of Peirce's theories of number and finite and transfinite sets in relation to Cantor and Russell's theories of the same.

expressed in terms of man's individual ignorance and error, identity remains, since it "consists in the *consistency* of what he does and thinks, and consistency is the intellectual character of a thing, that is, expressing something" [CP 5.315], where by "expressing something" is meant being the embodiment of an abstraction: "When we think, then, we ourselves are a sign" [CP 5.283]. In the long run, provided inquiry is carried out in the correct way, both the individual and the community will come more and more into conformity with the divine mind through the gradual elimination of ignorance and error, this being the sole aim of inquiry.

"The real, then, is that which, sooner or later, information and reasoning would finally result in, and which is therefore independent of the vagaries of you and me. Thus, the very origin of the conception of reality shows that the conception essentially involves the notion of COMMUNITY, without definite limits, and capable of a definite increase in knowledge." [C.P 5.311]

### **Peirce and Mathematics**

Since Peirce's theory of number is one of the main bases for his later philosophy, it seems appropriate at this point to make a brief examination of his more general conceptions of what mathematics is, and its role in the scheme of the sciences. Again, time and space constraints do not allow for any deep-going discussion of this particular issue here, and those who might be interested in looking into this topic more closely are referred to Murphey's (1993, pp. 183-288) comprehensive and interesting background discussion of the main developments in nineteenth century mathematics, and Peirce's own mathematical theories and the role they played in his time in this particular arena of science<sup>40</sup>.

Peirce's father, Benjamin Peirce, defined mathematics as "the science which draws necessary conclusions"<sup>41</sup> Charles, who had worked with his father on this particular paper enthusiastically adopted this definition, and commented in his notes to his father's paper that "In truth, no two minds could be more directly opposite than the cast of mind of the logician and the mathematician... The mathematician's interest in reasoning is as a means of solving problems... The logician, on the other hand, is interested in picking a method to pieces and finding out what its essential ingredients are."<sup>42</sup> Murphey argues convincingly that Peirce largely regarded mathematics as a purely formal deductive system. In such a system, premisses of any propositions made within the framework of the system are to be regarded as "pure hypotheses". The inherent meanings of the symbols and terms that are used is irrelevant - they are mere uninterpreted variables. The truth or falsehood of the premisses forming the basis of mathematical propositions is not an issue here, and thus these propositions "may be taken as definitions of the objects under the consideration of the mathematician without involving any assumption in reference to experience or intuition" [CP 3.20]

Peirce harboured a strictly Platonic view of number, in the sense that he maintained that numbers are ideas belonging to a different universe of experience (a "Platonic world of pure

---

<sup>40</sup> See also Eisele (ed.) 1976.

<sup>41</sup> Benjamin Peirce, "Linear Associative Algebra", American Journal of Mathematics, IV, 97 (1881), notes and addenda by C.S. Peirce. Cited in Murphey 1993, p. 229.

<sup>42</sup> *ibid.*

forms” [CP 4.118]) from facts and laws. They were nonetheless real, in that “their Being consists in mere capability of getting thought, not in anybody’s Actually thinking them” [CP 6.455]. Murphey (1993, p. 239) observes that mathematical entities thus form a quite unique class in Peirce’s ontology, as abstract entities they are never to be known in their entirety, being realised only in instances whence their reality consists precisely in their possibility through “getting”, rather than “Actually ” being thought.

Peirce derived his notion of continuity from Cantor, who had, with others, conceived that set theory might provide a way to unify arithmetic and geometry. Continuum belongs to geometry, whereas the collection or set belongs to arithmetic. Cantor’s theory was based on the idea that a collection of entities having the multitude of the set of real numbers, over which certain order relations are defined, possesses every property of the continuum, and may be treated as the continuum. Where entities are points on a real line, the continuum is a geometrical continuum. Using this principle geometrical entities may be defined in terms of point sets, and space, too, becomes a kind of set.<sup>43</sup> Since he held infinitesimals to be reals, Peirce did not agree that the multiplicity of the continuum could in any case be equal to any discrete multitude, and he maintained therefore that every interval on a line must be capable of further division. His concept of Kanticity was developed to support this principle. Something is kantistic if and only if “every part has itself parts of the same kind”. [CP 3.538-539] Peirce therefore maintained on his own theory of the continuum, that:

“a continuum, where it is continuous and unbroken, contains no definite parts; that its parts are created in the act of defining them and the precise definition of them breaks the continuity” [CP 6.168]

Peirce used this principle to point out that the fallacy of Zeno’s paradox of Achilles and the tortoise is precisely the assumption of the necessity of having to pass through an infinite series of discrete segments - the point of the paradox being that if there are an infinite number of such segments, then they will never be able to be passed through in a finite time, and Achilles will never overtake the tortoise. In Peirce’s view, the introduction of a discrete value measurement schema to define Achilles’ position at any given time introduces the fiction that there are discrete points on the line corresponding to the measurement scale values, which there are not since the continuum is wholly non-discrete, pure possibility, and thus independent of both measurement and any notions of magnitude. The paradox arises from the confusion of the thing measured with measurement.

Murphey concludes in this connection that:

“Peirce’s theory thus stands between those of the intuitionists and the logistic school. Whereas the latter regard elements as a pre-existing totality, and the former deny the existence of any elements not constructible, Peirce is willing to admit a pre-existing totality of possibilities, but recognizes only a small part of these as actually existent.” (Murphey 1993, p. 288)

---

<sup>43</sup> Wilder 1949, pp. 2f, 12-15. Paraphrased in Murphey 1993, p. 281.

This basic question of how actuality emerges from mere possibility, or in other words how actually existent things are possible, is more than anything else the fundamental problem that provoked Peirce to go on to develop his cosmology.

### **Quantification Theory and revision of the Categories**

In 1885 Peirce, working together at Johns Hopkins University with his then student O.H. Mitchell, discovered quantification theory<sup>44</sup>, and this led him to begin a further revision of his basic categories, especially in relation to the notion of Secondness. The discovery of quantification theory raised some rather fundamental problems concerning the actual nature of the object. Basically, quantification theory allows for the introduction of indices into the algebra of logic. These indexical terms, which Mitchell and Peirce introduced initially as  $F_1$  (the universal quantifier) to mean that “proposition F is true for every object in the universe” [CP 3.363], and  $F_u$  (the existential quantifier) which means that “the same is true of some object” [CP 3.363], Peirce then went on to develop into the notations  $\prod_i F_i$  and  $\sum_i F_i$  respectively, which became the standard symbolism of Boole-Schröder algebra.<sup>45</sup> Peirce’s previous logics had not contained any concept of the individual, and this meant that the notion of Secondness had to be revised accordingly. The index merely denotes things, it “asserts nothing; it only says ‘There!’” [CP 3.361]. In doing so, the relation of sign to object seen as “a correspondence in fact” of the earlier version of Secondness from the “New List”, which did not refer directly to an individual, which Peirce had up til then considered ideal entities, had to be changed.

Around this time, too, Peirce began to look again at the issue of the final opinion, for which had received some criticism, amongst others *Monist* editor Paul Carus, and which, as we remember, had caused some problems for his theory of reality. From this time on, Peirce mainly considered the coming of an ultimate agreement as purely a regulative principle, with the result that the Real, although its existence cannot be a priori proved, can be affirmed as a likely postulate well supported by present evidence. The Real then, in this view, depends on the coherence of observations, and thus the convergence of agreement of different observations made by different interpreters in the long run.

In about 1880, in a paper entitled “One, Two, Three: Fundamental Categories of Thought and of Nature” [CP 1.369-372; 1.376-378], Peirce first presented his new categories as three sorts of logical relations, monadic, dyadic and triadic. All possible logical relations, including the sign relation, are presumed to belong to these three classes, which are general. Every predicate of a proposition is classified by the schema, so the categories hold good for all possible cognitions. Here I follow closely Murphey’s (1993, p. 304) clear explication of this system of classification: Monadic relations include absolute terms [CP 1.370]. Dyadic relations can be genuine or degenerate; being degenerate if the relative properties derived from the relation would belong to those subjects even if the other correlate of the relation be eliminated. Triadic relations can be genuine, singly or doubly degenerate. Singly degenerate if dyadic relations between members of pairs continue to hold if the third is absent, and doubly degenerate if the subjects retain their relative properties independently of the other

---

<sup>44</sup> O.H. Mitchell, “On a New Algebra of Logic”, in *Studies in Logic by Members of the Johns Hopkins University*, 1885 pp. 72-106, pp [CP 3.351-354; 3.393ff]

<sup>45</sup> These terms came later to be written as  $(x)Fx$  and  $(Ex)Fx$  respectively. See also footnote 36 above.

correlates. In a genuine triad neither the relative character of the correlates, nor the dyadic relations among pairs of correlates would exist if any of the correlates were eliminated [CP 1.366f; 1.370-372]

Genuine dyadic and triadic relations can thus be considered irreducible, with all genuine triadic relations being combinatorial, and all combinatorial relations being triadic. The relation which holds between any two elements could not exist without the third, of which the sign relation is Peirce's best available example. The relation between sign and object is made by the interpretant (as third); the relation between the interpretant and object is made by the sign which brings the interpretant into that relation; and the relation between the sign and the interpretant exists only through the object as the common value in the extensional domain [CP 1.480; 6.32] Since all combinatorial relations are triadic, the categories are both irreducible and complete. With the above being seen specifically in relation to signs, doubly degenerate signs are icons since the characters derived from the relation would be possessed by it in any case, as would its object. If the relation is simply degenerate, the sign is an index, with a real relation to its object independent of any third. If the relation is genuine, the sign is a symbol [CP 2.247f]

In accordance with Kant's doctrine, which Peirce had come to accept, that the conception of the logical form of knowledge is to be considered a priori, while its content must come through sensory experience, the categories in the revised list now receive a double aspect: a formal aspect having to do with the logical classification of relations, while their material aspect has to do with the classification of experience.[CP 1.452]

With regard to Firstness, Firsts in their material aspect are not percepts (images with structures and combining a number of sense qualities), but simple and without structure. Every percept has a First which is the single impression created by the total ensemble of its elements. If a single sense quality is abstracted from a percept and considered alone, this quality is a First, not a concept, since it cannot be analysed or explained. They are "irrational", merely "modifications of consciousness" produced by the act of perception of the thing.

With regard to Secondness, Seconds in their material sense possess "thisness", the characteristic of being unambiguously designated by "this" - from which Peirce derives his principle of individuation.[3.434; 3.460] "Thisness" is associated with, and probably derived from<sup>46</sup>, the Scotian concept of "haecceity", which is a kind of experience involving "resistance", "brute reaction", "compulsion", "interruption", "intrusion" - a kind of shock. It is also "irrational", in that it cannot be known by reason, but only by means of its inherent "insistency" [6.318]. The possession of "thisness" gives existence to the object. This brings Peirce back to the Kantian position that existence can only be given in intuition, not in concepts [A50-52; B74-76] Thisness can be real, but reality is not thisness, thus the externality of an object can only be inferred from the experience of thisness, rather than proved.

Thirdness is not (insofar as we can speak of its material aspect)<sup>47</sup>, as opposed to Firstness and Secondness, "irrational", rather it is the category associated with rationality or intelligibility.

---

<sup>46</sup> See Murphey's discussion of this (1993, p. 310)

<sup>47</sup> See Murphey 1993, p. 313f for a more exhaustive discussion of this point.

The third aspect of the sign is the interpretant which has to do with the meaning of signs, but which is nonetheless not its meaning. The relation of a sign to its meaning exists only because the sign is interpreted as having that meaning by an interpretant, requiring that there is an infinite series of interpretant signs. The infinite series of interpretants does not actually constitute the meaning of the sign, but is a necessary condition if the sign is to have a meaning. Meaning itself lies outside of the series. By an extension of the Pragmatic Maxim the meaning of a concept is the possible future effects that its being lawful would necessarily determine - i.e. its "habits" cf. one of Peirce's earlier formulations that "what a thing means is simply what habits it involves" [CP 5.491] Peirce regards every instance of lawfulness as a sign, since whatever is subject to law is a necessarily a sign of the law it is subject to. Thirdness is thus both the category of law or regularity, and of rationality or intelligibility.

Peirce had, as mentioned previously, come to regard Thirdness as associated with continuity, in the sense that relations constitute continuous connections among their correlates, and relations cannot be created except as specifications of already existing relations (Murphey 1993, p. 318). New relations are therefore only possible as specifications of existing continuous connections. This is one of the basic assumptions of the notion of Synechism, which together with Tychism and Agapism, forms the conceptual basis for Peirce's cosmology.

If we again return to the issue of the terminological changes with regard to Peirce's three divisions of logic, it seems clear that the revision of the categories, coupled as it was with the discovery of quantification theory in some way lies behind Peirce's terminological shift to the triad of "Pure Grammar", "Logic Proper" and "Pure Rhetoric", documented by Fisch as having appeared around 1897. Especially the division of the three basic categories Firstness, Secondness and Thirdness into their formal and material senses carries with it the notions of purity or genuineness and impurity or degeneracy, which (and here I am of course merely speculating freely without recourse to any more substantial documentation than is provided in this present article), may well have given rise to the shift to terms involving concepts associated with purity and genuineness (cf. "Pure" and "Proper" in the triad above). Interestingly, Murphey notes at the end of his section on the first major revision of the categories that:

"It is obvious that the revision of 1885 led to very substantial changes in the definitions of the categories. Indeed these changes are so great that Peirce ought to have adopted new names for them to prevent confusion with his other papers. It is a striking example of Peirce's method of work that he did not do so. He evidently thought of these revisions as merely a correcting and developing of his system within the overall architectonic plan: the plan itself, including the terminology, remains unchanged. And nowhere in Peirce's writing is there any explicit statement which would indicate that beneath this shell of changeless terminology major alterations have been made. The result is a confusion which one who regarded himself as an expert on the ethics of terminology ought to have spared his readers." (Murphey 1993, p. 319-20)

Here, I would tend to be more sympathetic to Peirce's considerable labours and say that although the definitions of the categories certainly changed considerably in terms of their inherent content, the basic triadic nature of Peirce's ontology would have been rather difficult to convey by the use of other categorial terms than First, Second and Third. Also, as Murphey

too points out in a footnote to the above citation, the division into formal and material aspects is at the heart of the revision, and the formal nature of the categories is not in fact changed in any significant way. Additionally, I believe it is important to emphasize that at this stage, Peirce's normative theory of inquiry, which the Carnegie application of 1902 represents a reasonably clear presentation of, albeit in a rather schematic form, was at this time beginning to take shape, and the prominence given there to presentation of the logic and the three associated sciences of semeiotic, which in the Carnegie application are actually termed "Stechiologic", "Critic" and "Methodeutic", illustrate clearly that it was the development of this normative theory of inquiry that stood foremost in Peirce's mind around this time.

Murphey (1993, p. 358f) attributes to a certain extent the commencement of serious work by Peirce at the beginning of the twentieth century on this normative theory of inquiry to James' aggressive marketing of the term "Pragmatism" in his lecture at the University of California in 1898 (see also footnote 34 above). Peirce, as we have seen, came to disagree with what he considered James' far too utilitarian interpretation of the notion of Pragmatism, and since it had now become a highly public affair, he now felt obliged to try and qualify it in a way that would be more in accordance with his own conception of the term. Murphey (1993, p. 359) notes in this connection that:

"The sudden, almost spectacular, reformulation of Peirce's philosophy which occurred in 1901-02 cannot be laid wholly at James' door. As I have tried to show, many of the problems underlying it were in Peirce's mind before 1898 and would doubtless have reached solution in due time. What James did was to force the issue. Peirce was compelled to decide where he stood on a wide range of associated questions. The results were a sweeping revision of the architectonic, the introduction of phenomenology and normative science, and extension of the theology, and a complete revision of the theory of cognition."

In his cosmology, which he began to develop around 1890<sup>48</sup>, and which we shall unfortunately not be able to go into in much detail here, Peirce expounded the view that in evolution there is in the cosmos a general teleological tendency towards what he called the "growth of concrete reasonableness", which is basically grounded in the idea of the gradual evolution of rationality or lawfulness which is actualised by being embodied in action. Peirce's teleology does not, however, involve a completely determinist view of evolution towards some previously determined end, but rather what Carl Hausman (1993) in his brilliantly readable book "Charles S. Peirce's Evolutionary Philosophy" has characterised as a "developmental teleology", where spontaneity or "chance" plays an important role. In the first of his Monist papers, Peirce argued on the basis of his concept of "critical common sensism", which in turn was built upon his adaptation of Bain's doubt-belief theory in the evolutionary oriented theory of inquiry he had formulated in the 1870's, that the mind is naturally adapted through natural selection to the interpretation and understanding of nature, and that it is this adaptation that has led us to our present level of knowledge. We have, however, no certain way of being sure that our present sets of adaptations always will be functional, since the inherent element of chance in the evolutionary process makes it impossible to predict exactly how things will develop in the future. There is therefore a need for a comprehensive theory of cosmic evolution which will give us at least some idea of what

---

<sup>48</sup> Peirce's cosmology is largely presented in the five Monist papers mentioned previously (see footnote 12)

kinds of laws, if any, we may expect nature to follow, and to provide us with methods of coping with whatever kinds of situations that might possibly arise.

Peirce's cosmology explores the relationship between mind and nature and postulates that there is a continuity between the two, that universe itself is mind, and that natural processes cannot therefore be radically different from those of our thought as we attempt to fix our beliefs. The logical patterns of hypothesis (abduction), induction and deduction are consequently equivalent to those which the universe uses to create order from pure chance. The indeterminacy of pure chance, of which the developing universe is the most positive example of, correlates with the vividness of feeling that is associated with human consciousness, with the degree of consciousness being inversely correlated with the degree to which mind is ruled by habit. The real world is the world of mind, and real objects are no more than portions of mind which have taken habits and assumed specific forms. The universe is evolving slowly towards concrete reasonableness out of a continuum of pure feeling, which is in itself completely indeterminate, through initially spontaneous breaks in this continuity which constitute instances of a generalising tendency. This generalising tendency has a tendency to repeat, even though it is merely a result of the unlimited, arbitrary variation of the primal feeling. Once the tendency to repeat (i.e. to take habits) had appeared, there would be an increasing tendency for it to perpetuate itself. Hence there would be a general evolution of the cosmos from Firstness (pure feeling) through Secondness (actualities which repeat themselves) to Thirdness (lawfulness).

The universal mind is not, as are human beings and animals, subject to evolutionary selection and the struggle for survival, so that there must be some further purpose directing the evolutionary process. This is the "agapistic development of thought [...] distinguished by its purposive character, this purpose being the development of an idea" [CP 6.315] To explain agapé, Peirce invokes St John's statement "God is love", and takes the example of an idea that he himself is interested in. He writes:

"It is my creation. It is my creature; for as I have shown in last July's *Monist*, it is a little person. I love it; and I will sink myself in perfecting it. It is not by dealing out cold justice to the circle of ideas that I can make them grow, but by cherishing them and tending them as I would the flowers in my garden. The philosophy that we draw from St. John's gospel is that this is the way the mind develops; and as for the cosmos, only so far as it yet is mind, and so has life, it is capable of further evolution. Love, recognizing germs of loveliness in the hateful, gradually warms it into life, and makes it lovely. That is the sort of evolution which every student of my essay "The Law of Mind" must see that synechism calls for." [CP 6.289]

The living of the idea, through the concrete acts necessary for its "cherishing" is the governing idea for action and thought which constitutes the personality of the individual. Two persons are thus merely two ideas, and can become subsumed in a supra-individual personality, such as is manifested in the idea of the nation or the community in general. The evolving universe, then, since it is mind, and which individuals are an integral part of, in fact actually comprises the community of investigators. To the extent that individuals can, by constantly working to develop their methods of making their ideas clear, overcome ignorance and error, which in the long run is all that differentiates man from the universal mind, then they will come to converge with this community of mind. This represents a choice of free will; any man can if he wishes take part in the development of the universal mind through

allowing himself to adopt this path on the basis of “an immediate attraction for the idea itself, whose nature is divined before the mind possesses it, by the power of sympathy, that is, by virtue of the continuity of mind...” [CP 6.037]

To this end, it is necessary to develop a methodical and normative theory of inquiry. Peirce believed that the fundamental ideas of the special sciences are all classifiable by the categories, and thus that the categories are the basis of all special knowledge. The aim of his architectonic was to prove certain fundamental and general theorems with regard to all possible human knowledge. A systematic science of logic that is both grounded in the categories and which applies the necessary methods of mathematical reasoning to establish the truths of the logic so derived seemed to him the only way to achieve this. If the growth of concrete reasonableness is considered as an end in itself, and so as something inherently admirable, the characterisation of this reasonableness must be informed by aesthetics, the study of ends [CP 1615; 1.612]. Ethics then depends on aesthetics, and logic upon ethics. In the final draft of Memoir 9 of his Carnegie application “On The Bearing Of Esthetics And Ethics Upon Logic”, Peirce writes:

“I begin by explaining the nature of the normative sciences. They have often been mistaken for practical sciences, or arts. I show that they are at the opposite pole of the sphere of science, and are so closely allied to mathematics that it would be a much smaller error to say that, like mathematics, they were simply occupied in deducing the consequences of initial hypotheses. Their peculiar dualism, which appears in the distinctions of the beautiful and the ugly, right and wrong, truth and falsity, and which is one cause of their being mistaken for arts, is really due to their being on the border between mathematics and positive science; and to this, together with their great abstractness, is due their applicability to so many subjects, which also helps to cause their being taken for arts. Having analyzed the nature of the precise problems of the three, and given some considerations generally overlooked, I show that ethics depends essentially upon esthetics and logic upon ethics. [...] But the methods of reasoning by which the truths of logic are established must be mathematical, such reasoning alone being evident independently of any logical doctrine.”

He then goes on to explain how these methods might be refined through his division of logic in general into the three disciplines of stehiologic, critical logic and methodeutic. In a draft of Memoir 13 “On The Division Of Logic”, Peirce writes:

“Logic is primarily divided into stehiologic, critic, and methodeutic, which are defined in terms of the categories. Logic relates to terms, propositions, and arguments. Stehiologic treats of every variety. Critic has no direct bearing upon terms, upon analytic, or explicatory, propositions, nor upon necessary reasoning as such. It does, however, treat of meaningless and absurd terms, of irrelevant definitions, of fallacious demonstrations and of probable deductions. Methodeutic has no direct bearing upon any terms or propositions or upon any kind of reasoning except that which starts hypotheses. After critical logic has pronounced a hypothesis to be justifiable (being a verifiable hypothesis which explains the surprising fact), it remains to submit the hypothesis to methodeutic in order to determine whether it should be the first among the justifiable hypotheses to be considered. No such supplementary inquiry is called for in the case of a deductive or an inductive conclusion. Indirectly, however, methodeutic treats of all kinds of signs.” [MS L75, Memoir 13, Draft E (164-165)]

Murphey chose to end the 1961 edition of his excellent work on the development of Peirce's philosophy on a seemingly somewhat melancholy note, concluding that:

“As one reads through the thousands of pages of manuscript which is all that remains from Peirce's life's labor, one cannot escape the feeling that these are the ruins of a once great structure. Every paragraph and doctrine seem to be fragmentary parts of some larger whole. [...] But this is an illusion – Peirce's illusion: the grand design was never fulfilled. The reason was that Peirce was never able to find a way to utilize the continuum concept effectively. The magnificent synthesis which the theory of continuity seemed to promise somehow always eluded him, and the shining vision of the great system always remained a castle in the air.” (Murphey 1993, p. 407)

In his brief preface to the 1993 edition he however takes pains to explain that he never meant with this reflection to demean Peirce's standing as “the greatest American philosopher and philosopher, [...] a philosopher of the first rank – the equal if not the superior of any other thinker of the nineteenth century” (Murphey 1993, p. vi). And indeed, in another work published subsequently to the first edition of his book together with Elizabeth Flower (Flower & Murphey 1977), he goes on to describe how he believed Peirce actually did succeed in bringing his final system together.

What seems increasingly clear today is that Charles Sanders Peirce, one of our few true scientist philosophers, who until the day he died never gave up on the monumental task upon which he began with his first readings of Kant in 1855, the building of a comprehensive architectonic of theories, and who in his thinking predated many developments now at the forefront of modern science in innovative fields of mathematics and computer science such as chaos and catastrophe theory, complexity theory, dynamic systems theory, artificial intelligence and artificial life, to name but a few, actually did succeed, as Ransdell has consistently maintained previously, as well as one might expect any human being to do so in the course of a lifetime in realising what he set out to do, and all this in spite of a personally tragic life story which no one could possibly envy him.

If we go even further consider the extent to which various aspects of Peirce's thinking, and especially perhaps his fundamental triadic system of categories and the associated concept of the triadic sign relation, have permeated into and influenced, often in fundamental ways, modern thinking in fields so diverse as semiotics, sociology, psychology and cognitive science, art, music, literature and film studies, mathematics, linguistics, semantics, pragmatics, philosophy of language, mathematics, communication studies and the history and philosophy of science, it seems clear that even though, as Murphey points out above, Peirce was in his own lifetime never really able to utilise optimally the theory of continuity that he had painstakingly developed with the tools he then had at his disposal, his principles of the continuity of the mind, and of the community of investigators, seem still to be very much at work in favour of this particular philosophical project coming to some kind of fruition embodied in the “growth of concrete reasonableness”, at least in “the long run”.

## **Reference list**

- Audi, Robert (ed.) 1995. *The Cambridge Dictionary of Philosophy*. New York: Cambridge University Press.
- Ayer, Alfred, J. 1968. *The Origins of Pragmatism*. San Francisco: Freeman, Cooper and Company.
- Brent, Joseph 1993. *Charles Sanders Peirce: A Life*. Bloomington & Indianapolis: Indiana University Press.
- Corrington, Robert S. 1993. *An Introduction to C.S. Peirce, Philosopher, Semiotician and Ecstatic Naturalist*. Lanham, Maryland: Rowman & Littlefield.
- Daube-Schackat, Roland 1996. 'Peirce and Hermeneutics', in: Vincent M. Colapietro & Thomas M. Olszewsky (eds.) *Peirce's Doctrine of Signs: Theory, Applications, and Connections*. Berlin, New York: Mouton de Gruyter, pp. 381-390.
- Eisele, Carolyn (ed.) 1976. *The New Elements of Mathematics by Charles S. Peirce*. The Hague: Mouton Publishers
- Fisch, Max 1978. 'Peirce's General Theory of Signs.', in: *Sight, Sound and Sense*, Thomas Sebeok (ed.), Bloomington: Indiana University Press, pp. 31-70
- Fisch, Max, Ketner, Kenneth & Kloesel, Christian 1979. 'The New Tools of Peirce Scholarship, with Particular Reference to Semeiotic'. *Peirce Studies* 1 (1979): pp. 1-19.
- Flower, Elizabeth & Murphey, Murray G. 1977. *A History of Philosophy in America*. New York: Putnam's, II Chapter 10.
- Förster, Eckhart 1993. 'Introduction (with notes)', in *Immanuel Kant: Opus postumum*, from the *Cambridge Edition of the Works of Immanuel Kant*, translated by Eckhart Förster and Michael Rosen; edited by Eckhart Förster, Cambridge & Melbourne: Cambridge University Press, Volume 12, 1993, pp. xv-lvii.
- Hausman, Carl R. 1993. *Charles S. Peirce's Evolutionary Philosophy*. Cambridge: Cambridge University Press.
- Ketner, Kenneth Laine 1981. 'Peirce's ethics of terminology', *Transactions of the Charles S. Peirce Society*, 17: 328-347.
- Liszka, James Jakób 1996. *A General Introduction to the Semeiotic of Charles Sanders Peirce*. Bloomington & Indianapolis: Indiana University Press.
- Murphey, Murray G. 1993 (1961). *The Development of Peirce's Philosophy*. Indianapolis & Cambridge: Hackett Publishing Company Inc..
- Nöth, Winfried 1990. *Handbook of Semiotics*. Bloomington & Indianapolis: Indiana University Press.
- Ransdell, Joseph 1994a. *On the significance of MS L75: Peirce's Application to the Carnegie Institution. Some explanatory commentary*. Electronic document available at the following URL:  
[gopher://axp1.georgetown.edu/00gopher\\_root%3A%5Bpeirce.top%5Dtopintro.txt](gopher://axp1.georgetown.edu/00gopher_root%3A%5Bpeirce.top%5Dtopintro.txt)
- Ransdell, Joseph 1994b. *Charles Sanders Peirce Manuscript L75: Application to the Carnegie Institution (on July 15, 1902) for support for his Research in Logic, Preface*. Electronic document available at the following URL:  
[gopher://axp1.georgetown.edu/00gopher\\_root%3A%5Bpeirce.top%5Dtopintro.txt](gopher://axp1.georgetown.edu/00gopher_root%3A%5Bpeirce.top%5Dtopintro.txt)
- Sebeok, Thomas A. 1978 (ed.). *Sight, Sound and Sense*, Bloomington: Indiana University Press.
- Sebeok, Thomas A. 1981 (ed.). *The Play of Musement*. Bloomington: Indiana University Press.
- Weiner, Philip P. & Young, Frederic H. (eds.) 1952. *Studies in the philosophy of Charles Sanders Peirce*. First Series, Cambridge, Mass.: Harvard University Press.

- Weinsheimer, Joel 1996. 'A word is not a sign: hermeneutic semiotics and Peirce's "Ethics of terminology"', in: Vincent M. Colapietro & Thomas M. Olszewsky (eds.) *Peirce's Doctrine of Signs: Theory, Applications, and Connections*. Berlin, New York: Mouton de Gruyter, pp. 399-413.
- Weiss, Paul & Burks, Arthur 1948. 'Peirce's sixty-six signs'. *Journal of Philosophy* 42: 383-89.
- Wilder, Raymond Louis 1949 (revised edition 1963) *Topology of manifolds*. New York: Colloquium publications, American Mathematical Society.

## PEIRCE

References to Peirce's works are abbreviated as follows:

- CP [ V.¶ ] *The Collected Works of Charles S. Peirce*. 8 vols. Vols. 1-6, edited by Charles Hartshorne and Paul Weiss; vols. 7-8, edited by Arthur Burks. Cambridge: Harvard University Press, 1980. Reference by volume and paragraph, as in CP 2.235, which means Volume 2, paragraph 235.
- D[ n p ] Early numbered (n = 1-4) draft versions of the paper "On a New List of Categories", with page numbers provided. For example, D4 13 means Draft 4, page 13. This paper was finally published as part of a series by Peirce on logic and mathematics in *Proceedings of the American Academy of Arts and Sciences* no. 7 (1867), pp. 287-298. See also footnote 3 above.
- W [ V.p ] *Writings of Charles Sanders Peirce: A Chronological Edition*, initiated as the Peirce Edition Project at Indiana - Purdue University at Indianapolis by Edward C. Moore, initially under the general editorship of Max H. Fisch (until his death in , thereafter of Christian Kloesel, and now under the direction of Nathan Houser. Bloomington: Indiana University Press. 5 of 30 volumes published. Reference by volume and page, as in W 3.54, which means Volume 3, page 54.
- MS L75 *Manuscript L 75: Application to the Carnegie Institution (on July 15, 1902) for financial support*. The L 75 folder, which is stored at the Houghton Library, Harvard University includes not only the final version of the application submitted by Peirce (referred to as FV - page numbers in brackets, e.g. FV (346-349) refers to the final version, pages 346-349), but also five draft versions (A, B, C, D, E), which are referred to by letter and page number, e.g. A (21-29). Page numbers are not Peirce's own but come from a set of numbers stamped on a photocopied version of the original made for editorial purposes.

## KANT:

Citations from *Immanuel Kant's Critique of Pure Reason*, translated by Norman Kemp Smith, London 1956 are referenced by edition and page number, e.g.:

- A832 First edition (A), followed by page number (here 832)  
 B860 Second edition (B), followed by page number (here 860)

Annotations to, and discussions of (see Förster 1993 above), the English translation of Kant's "Opus postumum", published as *Immanuel Kant: Opus postumum*, in the *Cambridge Edition of the Works of Immanuel Kant*, translated by Eckhart Förster and Michael Rosen; edited by Eckhart Förster, Cambridge & Melbourne: Cambridge University Press, Volume 12, 1993, make references to the original German text as it is included in Volumes 21 and 22 of the German Academy Edition: *Kant's gessamelte Schriften*, edited by the Royal Prussian (later German) Academy of Sciences, Berlin: George Reimer, later Walter de Gruyter & Co., 1900- in the following generalised form:

AK[ V:p.¶ ] Where V is volume number, p is page number, and ¶ is paragraph reference, as in: AK 22:27.3-10, which is Volume 22, page 27, paragraphs 3-10. References which go over several pages will not generally include paragraph references, as in AK 21:51-5. Sometimes references to page notes are made in the following way: AK 22:238n

The same general principle applies to other central works by Kant cited in connection with "Opus postumum".