

## What a *Scientific Metaphysics* Really is (according to C. S. Peirce)

Jaime Nubiola<sup>1</sup>  
(University of Navarra, Spain)  
jnubiola@unav.es

[Text of Oral Presentation]

"The metaphysics of our best contemporaries lacks but little of the rank of a science".  
Charles S. Peirce, *CP* 2.9, c.1902

As some of you know, Charles Sanders Peirce stayed in Rome three times over the course of his life. These visits took place during his first European trip on the occasion of the American expedition to observe the solar eclipse in Sicily on the 22nd of December of 1870. There are two delightful letters from his first stay in October: one of the 14th of October to his mother and another of the 16th to his Aunt Lizzie describing with pleasure his visit as a tourist to the "City of the Soul", as he calls Rome, using the expression of Lord Byron<sup>2</sup>.

We have—at least up to now—no documents relating to his second stay (around 1-8 of December) with his wife Zina and other members of the expedition in their trip to Sicily, but we have detailed information about his third stay between the 1st and the 8th of January of 1871 thanks to his diary from those days. Rome was suffering from the *alluvione* of the Tiber of the 28th of December, registered on the walls of Piazza Navonna and in several other places. During my last stay in Rome, invited by Prof. Rosa Maria Calcaterra, I had the chance to follow with her some of the footsteps of Peirce through Rome. I will not go now into details, but I want to bring your attention to a text of his that we have chosen as a motto for the project of our *Grupo de Estudios Peirceanos* on Peirce's European correspondence and which seems to me specially suited to this Conference:

Philosophy is a study which needs a very protracted concentrated study before one [...] begins to be at all expert in the handling of it, if one is to be precise, systematic, and scientific. I gave ten years to it before I ventured to offer half a dozen brief contributions of my own. Three years later [1870], when I had produced something more elaborated, I went abroad and in England, Germany, Italy, Spain, learned from their own mouths what certain students at once of science and of philosophy were turning in their minds. (C. S. Peirce, Letter to *The Sun*, *MS* 325, p. 4, c.1907).

In the last fifteen years I have paid a great deal of attention to Peirce's visits to Europe. Although those trips were a mixture of scientific research and tourism, the study of Peirce's documents of those years has somehow transformed my understanding of his thought. It

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<sup>2</sup> Both letters are available at <<http://www.unav.es/gep/Roma14.10.70.html>> and <<http://www.unav.es/gep/Roma16.10.70.html>>. All corrections and suggestions—particularly from Roman readers—will be very welcome!

seems to me that it has enabled me to get a clearer view of the *cosmopolitan* Peirce—in Max Fisch's expression—and in what sense Peirce may be identified as a scientific philosopher.

My exposition will be divided into five sections: 1) a brief presentation of Peirce, focusing on his work as a professional scientist; 2) an exposition of Peirce's conception of science; 3) a sketch of the notion of metaphysics in the mature Peirce; 4) an attempt to answer the question of what a scientific metaphysics is; and finally, 5) a brief conclusion.

## 1. Charles S. Peirce, a true scientist-philosopher

First of all, I should state clearly that, although Peirce was a philosopher and a logician, he was first and foremost a real practitioner of science. Not only was he trained as a chemist at Harvard, but for thirty years (1861-91) he worked regularly and strenuously for the U. S. Coast Survey as a metrologist and as an observer in astronomy and geodesy. His reports to the Coast Survey are an outstanding testimony to his personal experience in the hard work of measuring and obtaining empirical evidence. For instance, when I was preparing this lecture I was working at the same time on the annotations on Peirce's letter of April, 30, 1875 to Carlile P. Patterson, the superintendent of the Coast Survey. Peirce was extremely happy about having been able to consult in Cambridge with John Clerk Maxwell about his research on measuring gravity through pendulum swinging and also to meet other scientific luminaries of his time<sup>3</sup>.

A glance at his *Photometric Researches* produced in the years 1872-75 immediately confirms this impression of a man involved in solid scientific work (*W* 3, 382-493). I agree with Victor Lenzen—whose serious studies about Peirce's scientific work are nowadays almost completely forgotten—that "Peirce's scientific work is relevant to his philosophy, for his philosophical doctrines indicate the influence of his reflective thought upon the methods of science" (Lenzen 1964, 33), and with Ketner's judgment, "Peirce was not a dilettante in science, but a master scientist" (Ketner 2009, 42). To summarize this in Fisch's words, "Peirce was not merely a philosopher or a logician who had read up on science. He was a full-fledged professional scientist, who carried into all his work the concerns of the philosopher and logician" (Fisch 1993, *W* 3, xxviii-xxix).

Peirce's personal participation in the scientific community of his time buttresses whatever he has to say about science from a philosophical point of view. Having done

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<sup>3</sup> I copy two paragraphs of his report: "I have had an interesting interview with Professor James Clark Maxwell who is a pendulum-swinger and a writer upon the mathematical theory of the resistance of the atmosphere and upon other subjects connected with Attraction. (...) I have still to see several distinguished gentlemen connected with pendulums, especially Professor Stokes who has investigated the resistance of the Atmosphere and who was largely consulted in regard to the methods of making pendulum experiments now used in the British work, General Sir Edward Sabine whom you know as a great swinger of pendulums, and Sir George Airy who swung at the top & bottom of a mine. I have visited the Greenwich observatory but the Astronomer Royal was away that day.

I feel the immense advantage of talking with all these people. For example, in all I ever saw in relation to the effect of the resistance of the atmosphere on pendulums it has been assumed that the resistance was proportional to the density of the air while the temperature has been left out of account altogether, but from considering the matter in the light of the mechanical theory of heat I was led to believe that the largest term of the resistance was independent of the density and also of the surface of resistance and was proportional to the absolute temperature. I was happy to find that Professor Maxwell who is one of the greatest authorities on the viscosity of air, and the best experimenter upon it, entirely agreed with me in this view." The letter is available at <http://www.unav.es/gep/Londres30.04.75En.html>>

research in astronomy, mathematics, logic and philosophy and in the history of all these sciences, Peirce tried all his life to disclose the logic of scientific inquiry. In addition to his personal experience of scientific practice, his sound knowledge of the history of science and of the history of philosophy helped him to establish a general cartography of scientific methodology. In this sense, following Hookway to some extent (1992: 1-3), I think that the most accurate understanding of Peirce's philosophy is to see him as a traditional and systematic philosopher, but one dealing with the modern problems of science, truth and knowledge on the basis of a very valuable personal experience as a logician and as an experimental researcher in the bosom of an international community of scientists and thinkers.

## 2. What a science is

Science is for Peirce "a living historic entity" (*CP* 1.44, c.1896), "a living and growing body of truth" (*CP* 6.428, 1893). Already in his early years, in "*Some Consequences of Four Incapacities*" (1868), Peirce identified the community of inquirers as essential to scientific rationality (*CP* 5.311, 1868). The flourishing of scientific reason can only take place in the context of research communities: the pursuit of truth is a corporate task and not an individual search for foundations.

Throughout all his life, but especially in his later years, Peirce insisted that the popular image of science as something finished and complete is totally opposed to what science really is, at least in its original practical intent. That which constitutes science "is not so much correct conclusions, as it is a correct method. But the method of science is itself a scientific result. It did not spring out of the brain of a beginner: it was a historic attainment and a scientific achievement" (*CP* 6.428, 1893).

Scientific growth is not only the accumulation of data, of registrations, measurements or experiences, but also requires creativity. To learn the truth requires not only collecting data, but also abduction, the adoption of a hypothesis to explain surprising facts, and the deduction of probable consequences which are expected to verify the hypotheses (*CP* 7.202, 1901). Abduction consists —Peirce writes to Mario Calderoni— in "examining a mass of facts and in allowing these facts to suggest a theory" (*CP* 8.209, 1905). Though the scientist is invariably a person who has become deeply impressed with the efficacy of minute and thorough observations, he or she knows that observing is never enough: "Science, then, may be defined as the business whose ultimate aim is to educe the truth by means of close observation" (*HP* 1123, 1898).

Here are two beautiful texts by the mature Peirce which define what a science is. The first one is from a 1902 manuscript on the classification of the sciences (*MS* 1343, 6-7, 1902):

Science is to mean for us a mode of life whose single animating purpose is to find out the real truth, which pursues this purpose by a well-considered method, founded on thorough acquaintance with such scientific results already ascertained by others as may be available, and which seeks cooperation in the hope that the truth may be found, if not by any of the actual inquirers, yet ultimately by those who come after them and who shall make use of their results (also in *CP* 7.55, 1902).

The second text comes from the manuscript of the Adirondack Summer School Lectures and deserves to be quoted a length (Ketner 2009, 37):

But what I mean by a "science" (...) is the life devoted to the pursuit of truth according to the best known methods on the part of a group of men who understand one another's ideas and works as no outsider can. It is not what they have already found out which makes their business a science; it is that they are pursuing a branch of truth according, I will not say, to the best methods, but according to the best methods that are known at the time. I do not call the solitary studies of a single man a science. It is only when a group of men, more or less in intercommunication, are aiding and stimulating one another by their understanding of a particular group of studies as outsiders cannot understand them, that I call their life a science. It is not necessary that they should all be at work upon the same problem, or that all should be fully acquainted with all that it is needful for another of them to know; but their studies must be so closely allied that any one of them could take up the problem of any other after some months of special preparation and that each should understand pretty minutely what it is that each one of the other's work consists in; so that any two of them meeting together shall be thoroughly conversant with each other's ideas and the language he talks and should feel each other to be brethren (*MS 1334*, pp. 11-14, 1905).

Probably there is nothing more alien to the present competitive style of science than this Peircean notion of scientists working together like brethren. It seems to me that is the task of philosophers to try to teach this *mode of life* through the defense of cross-disciplinarity and of the advantages of affective relations between colleagues in a Peircean spirit of agapastic reasonableness (Nubiola 2005a). [In the *Peirce Quote Book* that is in preparation for the centennial year I want to write about this wonderful quotation].

### 3. What metaphysics is

Charles S. Peirce's work in the *Century Dictionary* is almost unknown even to Peirce scholars<sup>4</sup>. Peirce was responsible for definitions in the fields of logic, metaphysics, mathematics, mechanics, astronomy, weights and measures, color terms, and many common words of philosophical import (Ketner 1986, 43). Between 1883 and 1909 Peirce devoted a significant effort to the preparation of thousands of entries, perhaps around 10,000. François Latraverse in Quebec is currently finishing volume 7 of the *Chronological Edition* dedicated to Peirce's work on the *Dictionary*. For our present concerns, it is relevant to learn that the entry "metaphysics" on p. 3734 of the *Dictionary* is attributed to Peirce. Let us read it with some attention in order to learn how the usages of that term were described by Peirce (I will skip the very illuminating examples):

1. The science of the inward and essential nature of things: a) As the subject of the books of Aristotle so called, first philosophy; ontology; the analysis of the nature of being in general; the doctrine of the first principles. b) Supernatural science; the doctrine of that which transcends all human experience. c) The science of the mind treated by means of introspection and analysis, and not by experiment and scientific observation; rational psychology. d) Any doctrine based upon presumption and not upon inductive reasoning and observation. e) An abstract and abstruse body of doctrine supposed to be virtually taken for granted in some science.
2. Philosophy in general; especially, the philosophical study of mind; psychology: so used from the time of Descartes, and especially by the Scotch school.
3. In the Kantian terminology, the science of God, freedom, and immortality.

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<sup>4</sup> The *Century Dictionary and Cyclopaedia*, W. D. Whitney, ed., The Century Company, New York, 1889-1891, vol. 1, p. 32. Accessible on-line in <http://www.global-language.com/CENTURY/>

The first section of the volume 6 of *Collected Papers* is entitled, using C. S. Peirce's phrase, "The Backward State of Metaphysics". Metaphysics is "one highly abstract science which is in a deplorably backward condition" (*CP* 6.1-5, 1898). Peirce considers that the "common opinion that metaphysics is backward because is intrinsically beyond the reach of human cognition" is a complete mistake. On the contrary, "metaphysics, even bad metaphysics, really rests on observations", rests upon "kinds of phenomena with every man's experience is so saturated that he usually pays no particular attention to them". For Peirce, the chief cause of its backward condition is that its leading professors have been theologians lacking the real scientific spirit, since they have been "trying to confirm themselves in early beliefs", while the "struggle of the scientific man is to try to see the errors of his beliefs". The passage continues:

We should expect to find metaphysics, judging from its position in the scheme of the sciences, to be somewhat more difficult than logic, but still on the whole one of the simplest of sciences, as it is one whose main principles must be settled before very much progress can be gained either in psychics or in physics.

Historically we are astonished to find that it has been a mere arena of ceaseless and trivial disputation. But we also find that it has been pursued in a spirit the very contrary of that of wishing to learn the truth, which is the most essential requirement of the logic of science; and it is worth trying whether by proceeding modestly, recognizing in metaphysics an observational science, and applying to it the universal methods of such science, without caring one straw what kind of conclusions we reach or what their tendencies may be, but just honestly applying induction and hypothesis, we cannot gain some ground for hoping that the disputes and obscurities of the subject may at last disappear.

To conclude this sketchy presentation of metaphysics according to Peirce it might be useful to remember its place in the classification of sciences as a branch of Philosophy, below Phenomenology and Normative Science (*CP* 1. 186, 1903) and its three branches (*CP* 1.192, 1903):

Metaphysics may be divided into, i, General Metaphysics, or Ontology; ii, Psychical, or Religious, Metaphysics, concerned chiefly with the questions of 1, God, 2, Freedom, 3, Immortality; and iii, Physical Metaphysics, which discusses the real nature of time, space, laws of nature, matter, etc.

As seem obvious at first sight, this triadic branching of metaphysics is roughly related to the three usages of the term "metaphysics" identified in the *Century Dictionary* and just quoted above: the only new thing is the replacement of the philosophical study of mind coming from Descartes and the Scotch school —now transferred to the Nomological Psychics or Psychology, *CP* 1.189— by *cosmology* under the label of "Physical Metaphysics".

#### **4. What is a scientific metaphysics?**

For years I had been impressed by the title SCIENTIFIC METAPHYSICS on the spine of volume 6 of Peirce's *Collected Papers*. I should say that I did not pay too much attention to this title until very recently, when I discovered with great surprise that this supposed —at least by me— Peircean expression occurs only once (*CP* 8. p. 284, c.1893) throughout the eight thick volumes of Peirce's *Collected Papers*. Besides the occurrence in

the title, it was used only twice by the editors, who put the term *scientific* into quotation marks. It appears in a footnote to *CP* 2.9:

See Preface to vol. 6 for Peirce's views regarding "scientific" metaphysics.

and in the "Editorial Note", of *CP* 6, p. v:

With the present volume Peirce's philosophical system reaches its culmination in a "scientific" metaphysics, the study of "thirdness as thirdness" or "efficient reasonableness" (5.121).

Two things are intriguing, first the quotation marks and second the real source of the expression. In relation with the first it seems clear that the use of quotation marks suggests that to talk about *a scientific metaphysics* was understood or felt by the editors to be a *contradictio in terminis*, or as an oxymoron, that is to say, they considered that nothing could be more strange or alien to science than Peirce's metaphysics. In fact, in the editorial note, after presenting a brief summary about the papers on ontology and cosmology collected in the first book of the volume, they say the following about the second part entitled "Religion":

The second book of the volume, devoted to religion or "psychical metaphysics," has rather tenuous connections with the rest of the system, offering, apart from scattered flashes of insight, views which have a sociological or biographical, rather than a fundamental systematic interest. (*CP* 6, p. v).

But, secondly, Scientific Metaphysics —without any quotation marks— is the general title of the volume which culminated the work done by "nearly all the members of the Department" [of Philosophy at Harvard] during fifteen years (*CP* 1, p. vi, 1931) and in recent years by Charles Hartshorne and Paul Weiss. In the general introduction it is said that "the sixth [volume] is concerned with metaphysics" (*CP* 1, p. vi, 1931), without any adjective. By now, my suggestion is that it was Hartshorne who coined the title "Scientific Metaphysics" for the volume and Weiss who put the quotation marks on the adjective 'scientific' in the editorial notes<sup>5</sup>. In support of my guess I want to bring two contrasting quotations from both editors: Peirce —Hartshorne said in 1965— "was the most scientifically trained philosopher I've ever read; in some ways much closer to concrete experimental science than Whitehead, for instance." (Hartshorne 1970, 157-158). And Weiss remembering his work as editor said also in 1965: "I found the material for Volume VI rather obscure and difficult. At that time I had little sympathy with it." (Weiss 1970, 174).

Perhaps Hartshorne found his inspiration for this title in the printed prospectus of a "planned and partly executed work of twelve volumes" by Charles S. Peirce under the general title *The Principles of Philosophy: or, Logic, Physics, and Psychics, considered as a unity, in the Light of the Nineteenth Century*, dated around 1893 and which was to be included by Burks twenty years later in *CP* 8, pp. 284-5. The prospectus was amongst Peirce's papers and is —at least up to now— the only known occurrence of that expression coming directly from Peirce:

Vol V. *Scientific Metaphysics*. Begins with the theory of cognition. The nature of reality discussed as in the author's papers in the *Popular Science Monthly*; but the position taken is

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<sup>5</sup> Perhaps it might be possible to find a clue in the correspondence concerning the edition of *Collected Papers* available at the Harvard University Archives. For instance, in the proposal for the first volume of Peirce's works prepared by C. I. Lewis around 1928, the term 'metaphysics' does not appear. (Letter of C.I. Lewis to James H. Woods, Harvard University Archives).

now set forth more clearly, fully, and in psychological detail. The reality of the external world. Primary and secondary qualities. The evidence of the real existence of continuity. The question of nominalism and realism from the point of view of continuity. Continuity and evolution. Necessitarianism refuted. Further corollaries from the principle of continuity.

I will not go into the study of that projected book and the distribution of its parts. Peirce himself says in a final comment:

Mr. Peirce does not hold himself pledged to follow precisely the above syllabus, which, on the contrary, he expects to modify as the work progresses. He will only promise that he will not depart from this programme except to improve upon it. The work is to be published by subscription at \$2.50 per volume. Address: Mr. C. S. Peirce, 'Arisbe,' Milford, Pa.

What I want to explore finally is some of what our colleagues have said about this label "scientific metaphysics". Andrew Reynolds, who has written a book on *Peirce's Scientific Metaphysics*, identified scientific metaphysics with *cosmology* (Reynolds 2002, 1), with "the Philosophy of Chance, Law and Evolution" as his subtitle explains. Others, like Joseph Esposito, considered that "although Peirce was the first to conceive the task of creating a genuine *scientific* metaphysics in modern form, he was far from fully realizing it" and suggested the need for comprehensive philosophies of quantum mechanics, of thermodynamics and so on (Esposito 1980, 5-7).

Most of the authors simply do not use the expression "scientific metaphysics" or use it without paying particular attention to the label (Murphey 1993, 101; Hookway 1992, 262 and 2009, 472). Kelly Parker emphasizes that "Peirce insisted in two things. First, metaphysics must be admitted as a legitimate subject of inquiry. Second, metaphysics must be treated as a science among other sciences" (Parker 1998, 190). De Waal rightly suggests, "Peirce rejected the idea that science and metaphysics are radically opposed. Instead, he argued for a 'scientific metaphysics'", that is, a metaphysics developed through the scientific method and with the scientific attitude, paying attention to "the most general features of reality and real objects" (*CP* 6.6, c.1903), as an observational science upon everyday experience (De Waal 2001, 62, and ch. 6).

In this sense it might be said that in a Peircean spirit *good* metaphysics is that pursued with a scientific method and attitude, while *bad* metaphysics is just the unscientific one. I would like to summarize this position by quoting Susan Haack's luminous words:

The [pragmatic] maxim is not intended to rule out metaphysics altogether, but rather to discriminate the illegitimate, the pragmatically meaningless, from 'scientific' metaphysics, which uses the method of science, observation and reasoning, and which is undertaken with the scientific attitude, that is, from the desire to find out how things really are —and not, as happens when philosophy is in the hands of theologians, from the desire to make a case for some doctrine which is already immovably believed. Scientific philosophy, as Peirce conceives it, is an observational science, differing from the other sciences not in its method but in its reliance on aspects of experience so familiar, so ubiquitous, that the difficulty is to become distinctly aware of them (Haack 2003, 776).

Haack adds —and I firmly agree with her— that it would be a misunderstanding to think of Peirce's aspiration to make philosophy scientific in a *scientistic* or reductionist way: "Peirce expressly denies that philosophical issues could be resolved within, and certainly never suggests that philosophy ought to be replaced by, the natural sciences".

## 5. Conclusion

It is not easy to find out the real source of the title *Scientific Metaphysics* on the spine of volume 6 of Peirce's *Collected Papers*. It reflects well Peirce's aspiration of developing metaphysics within the scientific spirit, covering ontology, cosmology and traditional religious issues like God, freedom and immortality. The label *scientific metaphysics* reminds us today not only that metaphysics cannot be replaced by science, but also that research in all these branches of metaphysics should be pursued with the openness of the scientific spirit. As Claudine Tiercelin wisely suggested in her inaugural address in the Collège de France, most of this task is still pending for the 21st century, and the Peircean framework of a scientific metaphysics paves the way for "re-starting to breathe" (Tiercelin 2011, 79).

Thank you very much for your attention.

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*HP* Eisele, Carolyn (ed.). *Historical Perspectives on Peirce's Logic of Science: A History of Science*, vols. 1-2. Berlin: Mouton 1985.

*MS* *The Charles S. Peirce Papers* 32 microfilm reels of the manuscripts kept in the Houghton Library. Cambridge: Harvard University Library, Photographic Service 1966.

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