

## **Drawings, Diagrams and Reasonableness in Charles S. Peirce's Letters during his First Visit to Europe (1870-71)**

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This article will examine a total of twelve drawings which illustrate six of the 17 surviving letters from Peirce's first trip to Europe (June 1870- March 1871)<sup>2</sup>. The illustrations are simple, but they are outstanding examples of one of the deepest convictions of Peirce: Reason is not a mechanical skill and thought is not a linear process. A broader notion of reason, that is, *reasonableness*, makes sense of Peirce's use of drawings and diagrams, since one of the key elements of reasonableness is the imagination. According to Peirce, reasoning is also a visual and diagrammatic process. In his letters Peirce includes drawings that illustrate and clarify what he means.

Accordingly, the paper is arranged in three sections. First, we discuss some of the results of our research into Peirce's European correspondence relating to art and aesthetics, since they help to understand the context in which Peirce wrote the letters with the illustrations. Second, we give a presentation of Peirce's notion of reason and his idea of visual and diagrammatic thinking; finally, we include and briefly discuss a selection of the illustrations found in Peirce's European letters from 1870-71.

### **1. Art and Aesthetics in Peirce's European Correspondence (1870-71)**

Charles S. Peirce traveled to Europe on five different occasions. The five trips occurred between the years 1870 and 1883, all of them in the service of the Coast and Geodetic Survey, at that time the leading scientific agency of the United States. These trips made it possible for Peirce to become acquainted with European scientists and to further his international reputation as a researcher. The first trip to Europe extended from June 18th, 1870 to March 7th, 1871, all in all almost nine months. When leaving, Peirce was a young man of thirty years, with "high hopes," as he wrote to his mother in his brief goodbye letter from Sandy Hook, New York, on June 18th. The main goal of Peirce's first trip to Europe was to identify possible locations suitable for establishing observatories in order to study the total solar eclipse that was to take place at noon on December 22nd, 1870 over the Mediterranean Sea.

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<sup>2</sup> There is a great deal of information —most of it until now only in Spanish— available at the web site of the project "Peirce's European Correspondence: Artistic Creativity and Scientific Cooperation", developed by our *Grupo de Estudios Peirceanos* during the years 2007-10: [<http://www.unav.es/gep/PrimerViaje.html>]. In particular all the letters quoted in the paper are available as digital images, with an English transcription and a heavily annotated Spanish translation. Some of the results of the research have already been published in our paper "Charles Peirce's First Visit to Europe, 1870-71: Scientific Cooperation and Artistic Creativity", *European Journal of Pragmatism and American Philosophy*, I, 1 (2009), 1-18.

Moreover, his father Benjamin Peirce wanted to introduce his son to several European scientists. Charles Peirce's itinerary led him from London to Berlin, Dresden, Prague, Vienna, Pest, the Danube river, Varna (Bulgaria), the Black Sea, and, finally, Constantinople. From Constantinople he traced back along the path of totality of the eclipse from East to West in search of locations suitable to observe the phenomenon in Greece, Italy and Spain.

This journey constituted a very important experience for the young Charles Peirce, who was visiting Europe for the first time. His letters show Peirce's human side, and are full of accounts of the impressions that the various places made upon him. In his letters Peirce often dwelt on his admiration for beauty, whether in nature or in artifacts, and he enjoyed sharing with his reader the feelings which the contemplation of beautiful things elicited in him. The core of his aesthetic experience was often related to this admiration, whether for the greatness of nature or for manmade things. Some works of art struck him as particularly beautiful. Thus, he felt great admiration for the Tiergarten in Berlin which he describes as "enchanted," for Potsdam and Sans Souci, for the mosque of Suleiman in Constantinople, for a bust of Faustina in Catania "which I couldn't tire of looking at" (letter of September 22nd), and for the basilica of Santa Maria Maggiore in Rome, which he mentions in a letter of October 14th, addressed to his mother, where he wrote that he "was greatly struck by this church." But he also marveled at the Bohemian mountains, the Hungarian hills, the Carpathian mountains, the Danube —of which he wrote, while sailing down the river towards the Black Sea, that "I believe no river in the world is so fine as this part of the Danube" (letter of August 28th)—, and the Bosphorus. He expressed his sense of awe as he experienced the famous view of Constantinople when approached from the sea, and he marveled at the sight of Ossa and again at the appearance of Pelion in Greece.

Whenever Peirce explained why he liked or disliked something, he always did so in function of its capacity to convey something to the beholder. Thus, in his letter written from Berlin on July 30th of 1870, he remarked that the sculptures and architecture of the city fail to produce any real effect on the visitor:

The architecture and sculpture have a very artificial and made up look, generally imitations of classic style and fail altogether of any real effect even when you must acknowledge them to be fine. The finest thing is the Victory over the Brandenburg Thor [*sic*] and that has the effect of a small bronze. The artist has taken no advantage at the large size to produce any particular effect of greatness or sublimity.

Similarly, when he referred to St. Peter's cathedral in Rome, he remarked that "there is an absence of true belief about St. Peter's. Its got up. [...] It is the enormous size & perfect proportions of St. Peter's that impresses one. Beyond that there is nothing great about it" (letter of October 14th). This complaint too foreshadows Peirce's later conviction that art consists precisely in expressing something and in producing some effect in those who contemplate the work of art; art must represent a quality of feeling, which as such is purely possible, so as to make that possible quality of feeling actually felt in the interaction between the work of art and the beholder. The true creative power of the artist is to capture what cannot be grasped, and making it reasonable. The artist grasps and expresses what otherwise would remain hidden, unrealized, and merely possible.

Contrary to most people, who consider aesthetics as something completely opposed to rationality, Peirce saw art as representing a form of thirdness, or reasonableness. According to this conception, the artistic phenomenon requires the combination of three elements. To begin with, there is firstness, the quality of feeling that the artist perceives without even being

conscious of it; then there is the reaction to this firstness, as it appears in writing, in painting or in another form of creation, and thus giving rise to something that exists in the actual world, a work of art in a world of facts, which in Peircean terms is of the order of secondness; and finally there is representation (in Peircean terms, of the order of thirdness), which is the capacity to grasp ineffable firstness, and translating it into something communicable by means of sentences, lines, or a succession of musical sounds. Together, the three categories are at the heart of the artistic phenomenon.

In his letters Peirce referred to the amazing multitude of feelings, sensations and impressions to which he was exposed in his European trip and which he wanted to hold on to. In his letter of August 28th, he wrote: "I thought today I would rest & write letters. I have seen so much that unless I go over it in my mind it will escape me. I feel I have now forgotten ever so many things which interested me greatly".

At the same time, his great desire to give an account of the strong impressions raining down upon him was matched by his awareness of how difficult it was to do justice to them, simply because their character of firstness resisted all attempts to put them into words, or even drawings, which he considered more expressive than mere words, but nevertheless insufficient. This is expressed, for instance, in a letter from August 28th, wherein Peirce wrote that he was seeing things which his imagination was "incapable of picturing" and his memory was unable to retain. For instance, he tried to reproduce the bust of the empress Faustina that he had enjoyed so much in Catania, but he did not succeed in doing so: "Here was another thing not to be reproduced. Memory itself cannot do justice to this beautiful work" (letter of September 22nd). In the same letter he added that his drawings of a Venus that had struck him as being so beautiful that it in some sense it surpassed even Titian's Venus, were incapable of expressing the essence of that work of art, and were therefore no more than "positive libels."

In sum, Peirce's European experience may well have been an important source for Peirce's later view of the artist as a person who is able to give form to what cannot be expressed, to soothe anxiety, and to express the admiration which something inspires in him. In some sense, in these letters Peirce makes evident the inability of words and ordinary reasoning to express something as great as beauty. It is necessary, although sometimes not sufficient, to add to reasoning imaginative elements, drawings and diagrams that attempt to clarify what words can not express, in a manner similar to what the artist does in his work.

## **2. Peirce and diagrams: reasonableness**

Peirce repeated on numerous occasions throughout his many works that diagrams illustrate the general course of thought (cf. "Prolegomena to an Apology for Pragmaticism", CP 4.530, 1906). This idea corresponds to his belief that reasoning is not a mechanical function, nor a closed mental faculty. Peirce's notion of reason, very distinct from the isolated and exclusionary conception of reason derived from rationalism, may be called "reasonableness"<sup>3</sup>. Reasonableness is an ideal to be incarnated in a creative way, and implies the human ability to introduce new intelligibility, to make sense of one's own life and to try to

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<sup>3</sup> This section of the paper is an abridged version of S. Barrena, *La razón creativa. Crecimiento y finalidad del ser humano según C. S. Peirce*, Rialp, Madrid, 2007. The term "reasonableness" appears very late in Peirce's texts, since his usage of it covers only the ten years between 1899 and 1908. Cf. J. Nubiola, "What Reasonableness Really Is", *Transactions of the Charles S. Peirce Society* 45/2 (2009), pp. 125-134.

make it reasonable, together with what surrounds it. Reasonable beings are creative beings, growing, seeking to expand their ideas, generating new meanings, seeking truth through science and developing habits that help them to live and communicate better.

Reason is not a closed and rigid faculty, requiring fixed bedrock principles and having to find a self-evident foundation for itself. Reason may be more precisely characterized by its relationship with ends. Around 1902, Peirce wrote: "The essence of rationality lies in the fact that the rational being *will* act so as to attain certain ends. Prevent his doing so in one way, and he will act in some utterly different way which will produce the same result. Rationality is being governed by final causes" (*CP* 2.66, c.1902). Reason is not something separated which dissects problems, nor is it merely consciousness. The essence of reason is thirdness, allowing us to connect things together, allowing us to compose (cf. *CP* 6.343, 1908).

Thus, Peirce overcame the split that modernity, with its emphasis on the rational, caused between mind and body, between reason—which appeared as an analytic and calculating power—and the imaginative and emotional. Anything that did not belong to the realm of rationality was left out or discarded. Against this rationalistic view it must be acknowledged that logical inferences emerge from our experience, in a continuum of levels that must be taken into account. Not only is it necessary to fill in the gaps in the study of rationality, but also to find a new way of conceiving it in which imaginative structures, for example, have a central place. Not everything is a matter of logic, or to put it another way, logic is broader than was understood by rationalism; it is not only strictly deductive. "Nothing new can ever be learned by analyzing definitions", wrote Peirce (*CP* 5.392, 1878). For its development, reasonableness depends upon feelings, imagination, and instinct, and it relies not only upon deductive logic but also upon a broader way of thinking that may even be illustrated by our minds and in our imagination with drawings and diagrams.

In his "Neglected Argument for the Reality of God", Peirce wrote about a particular occupation of the mind he called *musement*. This peculiar activity, which is to let the mind wander without rules or purpose, is for Peirce at the root of all reason and was, for him, of extraordinary fertility. It is in that activity, so contrary to what is sometimes meant by 'rational', in which logical analysis, according to Peirce, can achieve its full efficiency. Peirce wrote:

"Enter your skiff of Musement, push off into the lake of thought, and leave the breath of heaven to swell your sail. With your eyes open, awake to what is about or within you, and open conversation with yourself; for such is all meditation." It is, however, not a conversation in words alone, but is illustrated, like a lecture, with diagrams and with experiments (*CP* 6.461, 1908).

Consistent with this belief, in the writings and correspondence of Peirce there abound diagrams and drawings. These are figures that clarify the meaning of the text or even form part of it. Peirce affirmed that he *thought* in visual diagrams (Oostra 2003: 2-3; Kent 1997) and that all valid necessary reasoning is in fact diagrammatic (*CP* 1.54, c.1896).

For Peirce, diagrams are visual arrays of characters or lines (cf. *CP* 3.560, 1898). They work as iconic signs and "are so completely substituted for their objects as hardly to be distinguished from them". In fact, Peirce argued that at the very center of our reasonings we forget their abstractness in great measure, and that there "the diagram is for us the very thing". Precisely at this point, Peirce used an example from art; he stated that "in contemplating a painting, there is a moment when we lose the consciousness that it is not the thing, the

distinction of the real and the copy disappears, and it is for the moment a pure dream — not any particular existence, and yet not general. At that moment we are contemplating an *icon*" (CP 3.362, 1885). Diagrams, Peirce wrote, are especially needed by reasoning, since all "reasoning has to make its conclusion manifest", and therefore must be chiefly concerned with forms, showing the intelligible relationships between these forms, as in a diagram (CP 4.531, 1905). The diagram does not guarantee that the object exists, but "it is of the utmost value for enabling its interpreter to study what would be the character of such an object in case any such did exist" (CP 4.447, c.1903).

Diagrams are, according to Peirce, an essential part of certain types of reasoning, for example, of mathematical reasoning, which "consists in constructing a diagram according to a general precept, in observing certain relations between parts of that diagram not explicitly required by the precept, showing that these relations will hold for all such diagrams, and in formulating this conclusion in general terms" (CP 1.54, c.1896). The diagram expresses the abstract relationships between the premises from which a hypothesis emerges. In order to test it, experiments are made on the diagram, which is changed in various ways until the right one is found (cf. CP 2.778, 1901).

In short, according to Peirce, thought is *illustrated*, and drawings and diagrams, built with the help of the imagination, are a central part of the activity of our mind.

### **3. The drawings in Peirce's letters of 1870-71**

The letters from Peirce's European tour on 1870 and 1871 are rich in drawings. According to what has been suggested in the preceding section, Peirce tried to illustrate his thoughts with them. The images are not something secondary to the thread of the narrative. They not only illustrate what Peirce was describing, but also sometimes even serve as diagrams that help to clarify the thought and to emphasize the ideas he wanted to convey. For example, in the letter from Rome on October 14th, 1870 to his mother, Peirce made a map of the route that he followed in the city (Fig. 1):



There is an absence of true belief about St. Peter's. It got up. It confirmed me however in thinking that St. Paul's in London is really a very fine church. It is the enormous size & perfect proportions of St. Peter's that impressed me. Beyond that there is nothing great about it. After St. Peter's. I drove to the Pincio which has been celebrated as a Park for some 2000 years. Here I saw many fine equipages & after driving about a good deal & admiring the view & the surroundings came back to my hotel to dinner. I think I saw a good deal in six hours. The secret of the Pincio

[Fig. 1: Letter of October 14th, 1870, p. 5]

The sketch not only serves as an illustration of what he just has written, but also gives an idea of the length of the route he had done that day. Peirce reinforced with the drawing the idea expressed in his words a few lines before: I “have been very successful today I think in utilizing every moment.”

In several cases, Peirce's drawings are related to geometry or forms of the places he visits. On September 22, 1870, in a letter to his wife, Peirce drew the terraced vineyards in the hills of Sicily, whose horizontal lines produce a peculiar effect on the visitor. He wrote: "They were often covered with vines when not too steep (...) These hills also derived a peculiar effect from being all covered over with horizontal lines thus." With his drawing Peirce attempted to cause in his wife the same effect that it had upon him.

In the page 4 of the same letter, Peirce drew two drawings to illustrate his descriptions to his wife. In the first place, he drew a diagram of the various craters of Etna, which are, in turn, small mountains, and also added an exotic cactus below, "the Indian fig a tropical-looking juiceless thing". In this last case and in other places, Peirce's pictures became more figurative, trying to convey how something was that he had seen. We could say they played the role of photographs, still uncommon in those days.




The shores of Calabria were very prominent & in the opposite direction over the land rose Etna majestic & awful. It is to see such things as this that it is worth while to come abroad things which no art can reproduce as there is a great deal else of interest about Taormina but I had no time for it & hurried back to breakfast & to descend. A woman carried down my things on her head. I took the train for Catania and as we approached Etna & I saw the awful extent of its fields of lava & their depth & how this enormous Etna was all blotched with craters each itself a mountain

I got a respect for it.  
You say I worship success, well this old

Yellow may have had bad aims but he has certainly carried out his views most thoroughly. The lava when it is many centuries old gets to be the most fertile soil. At first nothing grows on it, then the Indian fig & tropical looking juicy things, afterward other trees olives etc. finally grapes. I will tell you what Sicily is like. Take Nabant & magnify it 100 times in every dimension, clothe it with verdure in great measure, & you have it. Unfortunately there appeared to be no chance of ascending Etna a thing I very deeply regretted. The land was cloudy. It would clearly remain so till cold weather which comes soon now. I should



In this letter, Peirce also drew a diagram showing how close to the monastery in Catania the lava reached in the great eruption of Etna in 1669. He wrote: "I saw one very singular thing at this monastery. At the great eruption of 1669 a monstrous wall of lava, which after the lapse of two centuries is dreadful to see, came marching down to Catania and did indeed annihilate a portion of the city. So when this was coming down uncomfortably near to the monastery the holy brethren went out with the veil of St. Agatha or something the consequence being that it turned aside & now it is to be seen just grazing the building coming within ten feet of it in two places."

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 relic of St. Agatha or something the consequence being  
 that it turned aside & now it is to be seen just  
 jorzing the building coming within ten feet of it  
 in two places.  This struck me as mar-  
 vellous and as beyond a doubt -  
 an argument in favour of monasticism having  
 the special favour of heaven. I found however  
 that the earthquake of 1693 had not been so consider-  
 able but had totally destroyed the building, in consequence  
 of which another the present one was built & of course  
 was put as marvellously near the Cava as was thought  
 necessary. The morning after my arrival at Catania  
 it looked rather promising for a ride from Etna for the  
 next morning so I determined to go but the coachman  
 was so extortionate, demanding 35 francs to go  
 to Nicolosi & come back next day, that I gave it up. It  
 turned out I should have had a perfect surprise.  
 I was sorry for it is no doubt one of the greatest  
 sights in the world. So I left in a great hurry for  
 Syracuse leaving most of my baggage behind.  
 I took the train for Lentini & thence by diligencia  
 (10 francs!) to Syracuse. Arrived at night & put up  
 at the Albergo della Sole. Nobody speaks French  
 & I haven't even an Italian phrase book & I  
 can't understand one word of Italian nor the peo-  
 ple here one word of French, Of course English &  
 German are simply out of the question.

[Fig. 3. Letter of September 22nd, 1870, p. 6]

Also, on the letter of September 2nd, Peirce drew for his mother a sophisticated form of a tablet covered with Arabic script in the mosque of Hagia Sophia. Peirce wrote:

In the mosque the tablets with Arabic writing on them excited the particular admiration of my friends & they declared that the art of Arabic chirography was on a level with painting & that such things were to be compared with the pictures of Raphael. There was one tablet which looked something like this only more regular which I should have supposed to be a mere ornament, but they read it.



Now these gentlemen wouldn't give a backsheesh till they came out, so they hustled us all out. Then they poured forth such a volley of curses in Arabic as never was heard; and Arabic is a good sonorous language for that purpose. They kept this up together for about 5 minutes after which they spat on the floor & left. Me. Then the people were afraid that some of these curses would actually come down on their heads or not I don't know but the result was they sent after us & told us we might go in without any backsheesh. In the mosque the tablets with Arabic writing on them excited the particular admiration of my friends & they declared that the art of Chiro-Arabic Chirography was on a level with painting & that such things were to be compared with the pictures of Raphael. There was one tablet which looked something like this only more regular which I should have supposed to be a mere ornament, but they read it. It was not this sort however which they admired so much but another.

Constantinople 1870 all odd the most beau-



[Fig. 8 Letter of September 2, 1870, p. 6]

On September 15th Peirce described to his wife the strange appearance of houses in Messina: "The streets quite unlike any I had seen in England or Germany are still more unlike those of Thessaly & those of Turkey. They are handsome & clean streets & the third story of the houses is always very high something like this". He includes a beautiful drawing of a house with three floors and big windows typical of Mediterranean countries. In the same vein, on August 28th Peirce drew for his wife the shapes of the Hungarian church steeples that he had seen on his way from Vienna to Pest. With his drawing Peirce intended to convey the idea of novelty of everything on the banks of the Danube. He wrote: "Everything on the banks had a look of novelty, of which the form of the Hungarian church steeples will give some idea. Form N° 2 the commonest."

Constantinople. 1870 August 28. Sunday.

Dearest Lina - I arrived here today after a most interesting journey, from Vienna. I don't think by the way I remembered to say how beautiful my journey from Prague to Vienna was. It was so, the passage through the mountains of Bohemia being very fine. Very precipitous dark green hills descending to a very narrow valley in which wound a little stream. Passed through eleven dark tunnels. A capital town for young married people.

On Tuesday Aug 23 I left Wien early in the morning by boat & arrived at Pest that same evening just after dark. The way was through Hungary & the picturesque hills were crowned with great ruins of tremendous strong holds erected I suppose for defence against the Turks. Every thing on the banks had a look of novelty, & which the forms of the Hungarian church steeples will give some idea



From No 2 the commonest. The mountains were often grand & the manner in which

[Fig. 10. Letter of August 28th, 1870, p. 1]



But perhaps the most striking design and most unknown of the drawings included in these letters is the one that he made on the verso of his letter from Syracuse on September 22nd, 1870. Peirce drew with a pencil, as children sometimes like to do, the contour of his own right hand and pointed out numerous bites caused by fleas in the hotel where he was staying. All this served to emphasize that "Syracuse is a disgusting place" and to implore the compassion of his wife. The picture is much more graphic than any complaint and finely exemplifies the role of the drawings in the European letters.



[Fig. 6 The contour Peirce's right hand with the flea bites, Letter of September 22nd, 1870]

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