Review of Charles S. Peirce, *Logic of the Future. Writings on Existential Graphs*, Volume 1: History and Applications, edited by Ahti-Veikko Pietarinen, Berlin-Boston, Walter de Gruyter, 664 pp.

It is a pleasure to welcome the first volume of a work which finally brings together in a carefully edited format Peirce's hereto unpublished logical writings. The title «Logic of the Future» is a quote from Peirce's correspondence with William James: on the 25th of December, 1909, Peirce wrote to James that «my existential graphs […] ought to be the Logic of the Future» (R L 224; this volume, p. 13). This alludes, according to Pietarinen, to «the realisation of the full generality of the graphical method that Peirce predicts is awaiting us in the future» (*ibidem*), but also to the lack of recognition that his graphical logic obtained during his lifetime. Charles S. Peirce (1839-1914), scientist and philosopher, considered himself «first and foremost a logician». During his life, he produced over 100,000 pages of notes and drafts, of which the greatest part is kept at the Houghton Library, Harvard University (*The Charles S. Peirce Papers, 1787-1951, MS Am 1632*). Of this manuscript legacy, 50,000 pages are still unpublished. Pietarinen's edition (considering all 3 volumes, the last two yet to appear) brings "nearly 5,000" pages on Peirce's graphical logic to light (p. 4; see the "Editorial Essay" for details). The sheer quantity of new material which this work makes accessible will make it an invaluable resource for scholars interested in Peirce's thought as well as in the history of logic, the development of formal languages, logical notations considered historically or philosophically, and the intertwinement of logic and epistemology. Besides the transcription of texts, this edition stands out for the accurate and meticulous rendition of graphs. Thanks to Jukka Nikulainen's beautifully engineered LaTeX package (EGpeirce), Peirce's continuously changing graphical notation, which had been the nightmare of any typesetter in the few occasions where some graphs made it to publication, can now be drawn *in text* (as Peirce wished) in a clear and faithful manner. Pietarinen's edition is not just a rich resource book

for the specialist: it also aims to introduce and facilitate the study of Peirce's logic and to offer a general interpretation of it.

The contents of volume 1 are divided in three parts: "Reasoning and Diagrams", "Development of Existential Graphs", and "Theory and Application of Existential Graphs". Since Peirce would often work on different topics at the same time, Pietarinen organised the material both chronologically and thematically in part 2 and 3. The manuscripts constituting part 1 are instead presented in reverse chronological order, which allows readers to familiarise themselves with the graphs in a gentler way. In this didactic spirit, the prefatory material to the volume includes a helpful *Introduction to the Theory of Existential Graphs*. The exposition of Peirce's notation and conventions is clear and functional, with an abundance of examples from Peirce's own manuscripts, including some which will appear in the next volumes (e.g., the 1903 Lowell Lectures, which constitute the heart of volume 2). In this respect, this volume succeeds in being an aid for learning graphical logic today besides being a resource for the historian of logic. In the *Introduction*, Pietarinen also adopts his long-standing interpretation of the graphs as instances of game-theoretical semantics (p. 17). This may come as a surprise to the historian of logic unfamiliar with Pietarinen's previous engagement with the graphs and may be one of the most controversial aspects of the present work. Some clarification is therefore in order.

As acknowledged by Pietarinen, the origins of the game-theoretical interpretation of Peirce's graphs date back to Risto Hilpinen (1982). Hilpinen observed that the language used by Peirce on occasions to describe the meaning of quantifiers in assertions «*resembles* the modern game-theoretical interpretation of quantifiers» (Hilpinen, 1982: 185; emphasis added). Indeed, since his very early formulations of graphical theory – e.g., the «Memoir on Existential Graphs» appearing in part 2 of the present volume, and dated back by Pietarinen from 1901 (Robin Catalogue) to 1896-8 – Peirce highlighted the dialogical structure underlying assertions:

It will be necessary here to consider some facts of common observation about assertions. In order that an assertion should be consummated, it is requisite that it should have not merely a deliverer, or assertor, but also an interpreter, or ~~person~~ mind addressed. Thus, when a man consults an old diary of his own, the lapse of memory has somewhat impaired his personal identity, so that he is not precisely the same mind. Yet the assertion would convey nothing

if it did not relate to some object or objects in the common experience of deliverer and interpreter. (R 483; this volume, p. 298).

Thus, every act of thought which takes the form of an assertion could potentially be interpreted as a "game" for two players, the "assertor" and the "interpreter". The two players need not be two people: the role of the interpreter can be played by a future self, or indeed by any mind, actual or possible, i.e. by anything *acting as a mind* (as Peirce clarified in other passages). The identity of the interpreter can be vague because it is not this or that interpreter who has the power to turn an utterance into an assertion, but it is the possibility of dialogue embedded in the assertion's structure which qualifies the utterance in question as an assertion. On the one hand, the dialogical structure of assertions is maximally general, in that it applies to any assertion whatsoever and it allows the interpreter to be determined according to the circumstances. On the other hand, however, the notion of "common experience" as a condition for the effectual communication of the content of an assertion points to the possibility of a process of communication that may gradually draw assertor and interpreter closer to each other. The passage continues:

Thus, one man may inform another that if he pursues a certain road over which he has never travelled, and if he takes certain turns, he will come to a house concerning which he tells some story. But though the interpreter has never yet seen the house nor the road, yet the beginning of the road is there before the eyes of both parties. Without that or something analogous to it, the whole narrative would be a mere romance conveying no information. (*ibidem*).

In this case, the purpose of the "game" between assertor and interpreter would be, for the assertor, to manage to touch on that "something analogous" to direct experience which will put the interpreter in condition of understanding them; and for the interpreter, to summon their previous acquaintance of roads, turns, and houses to produce the initial setting of the assertor's story.

In other places, to which Hilpinen (1982) draws attention, the terms of the "game" are described differently, and they may indeed look closer to game-theoretic semantics. Crucial are the notions of "responsibility" for one's assertions and "penalties" in case the assertion turns out to be false (Hilpinen, 1982: 185). The "vagueness" of a term ("index") can be used antagonistically by the two players, to "force" each other into contradictions (*ibidem*) as both players

try to determine the truth (or falsity) of an assertion. In this case, however, the outcome of the skirmish between the two players is conducive to a common aim: the pursuit of truth. Thus Pietarinen (2014), building on Hintikka (1995), includes cooperation, competition, and make-believe as properties of the game-theoretical semantics that Peirce's graphs would embody. While Hilpinen (1982) cautiously stated that Peirce's graphs *resemble* game-theoretic semantics, in that they show some relevant features of it, now both Hilpinen (who writes the *Introductory Note* to this volume) and Pietarinen (2014; this volume) confidently assert that graphical logic *is* game-theoretical. This account, while it aims to emphasise the goal-directedness and action-inducing aspects of Peirce's logic – i.e., its *pragmatist* elements – risks paradoxically to obscure them by bringing a different terminology and a different history into the picture.

Besides historical concerns, Sun-Joo Shin (2002) criticises the reliance on Hintikka's (1988) model-theoretic perspective in graphical logic on the ground that it would neglect the proper feature of the graphs: iconicity. According to Shin, Hintikka's interpretation does not «provide us with a philosophically *sufficient* account of Peirce's invention of EG [Existential Graphs]» (Shin, 2002: 14; emphasis added), i.e. the model-theoretic account does not explain why Peirce would have felt the need to develop the graphs after having already introduced a symbolic notation which included quantification. While it is not possible here to give justice to this complex debate, mentioning it is useful to understand the philosophical frame of reference of this edition. Thanks to Pietarinen's sustained effort in completing it, it can be hoped that Peirce's own text will become the centre of any future debate concerning the iconic *and* model-theoretic aspects of his logic. Indeed, if the *Logic of the Future* lives up to its expectations, we may hope that it may be able to express – if not to reconcile – a great variety of logical attitudes, and to show their relevance for epistemology and communication theory. To borrow from Pietarinen's conclusion to his *General Introduction*: «The time will come when the world will be amazed at this» (R 280; this volume, p. 13).

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