Mirja Hartimo (ed.), *Phenomenology and Mathematics,* Springer, 2010, pp. 216, € 129.99, ISBN 9789048137282

Simone Aurora, Università degli Studi di Padova

Phenomenology and Mathematics appeared in 2010 as volume 195 of the important and prestigious series *Phenomenologica*, founded by H. L. Van Breda and published, starting from 1958, under the auspices of the Husserl-Archives.

The volume is at the same time a sign and a product of an increasing tendency, at least during the last 30-40 years, towards an acknowledgment of the importance of Husserl's philosophical work for the philosophy of science and, more precisely, for the philosophy of mathematics. This trend is especially due to a critical reassessment of Husserl's early writings on logic and mathematics, also encouraged by the publication, in the last decades, of a vast amount of new material dealing with these issues and of a great number of historical studies on the emergence of Husserl's phenomenology. As a result, as Hartimo remarks in the *Introduction*, "[i]t is beginning to be a commonplace that Edmund Husserl […] was originally a mathematician" and that therefore "[t]he roots of the phenomenological tradition are in the nineteenth century mathematics and logic" (p.xix). A collateral, but nonetheless very important, outcome of such a statement is that, thus, a way is paved "for overcoming the juxtaposition between the analytic and continental traditions" (p.xx).

The central question, which the nine articles try to answer, comparing Husserl's philosophy of mathematics mainly with constructivist and Platonist views, is the following: "What kind of philosophy of mathematics is phenomenology?" (p.xxi).

This question turns, in Richard Tieszen's contribution *Mathematical Realism and Transcendental Phenomenological Idealism*, into a new one: "is mathematical realism compatible with transcendental phenomenological idealism or not?" (p.1). The answer is negative, according to Tieszen, if we consider what he calls the "standard formulations" of mathematical realism and of its opposite, that is mathematical idealism or anti-realism. Yet this is not clearly a coherent answer, since, as the author points out, mathematical idealism "is distinct from transcendental phenomenological idealism" (p.4). Therefore, to answer the question more pertinently, Tieszen analyses, first, mathematical realism in all its facets, and then, discloses his understandings of Husserl's transcendental phenomenological idealism; in this terms, the author can give a positive answer to the opening question and state that in fact one form of mathematical realism, which he defines and calls "constituted realism" or "constituted Platonism", "is compatible with transcendental phenomenological idealism" (p.21).

As the title of his paper, *Platonism, Phenomenology, and Interderivability*, might suggest, also Guillermo E. Rosado Haddock stresses and tries to prove the basically Platonic structure of Husserl's philosophy of mathematics. He considers thereby this latter as "a sort of structuralist Platonism" (p.27). To this end, he contests the alleged relationship between Husserl's phenomenology and mathematical constructivism – especially of the Browerian sort – and challenges what he even calls "the myth of Frege's influence on Husserl" (p.23). Furthermore, he asserts the fundamental univocity and coherence of Husserl's ideas on mathematics throughout his scientific work. As an important result of his argument, both for research in the philosophy of mathematics and with regard to the Husserlian and phenomenological studies, Rosado Haddock states that "Husserl's philosophy of mathematics is […] the only philosophy of mathematics which (1) is coupled with an adequate semantics of sense and referent for mathematical statements and, moreover, this semantics is perfectly compatible with Tarskian semantics; (2) with the help of this semantics, one can adequately assess the interderivability phenomena; and (3) it is complemented by an epistemology of mathematics based on the […] categorial intuition" (p.41).

Claire Ortiz Hill's article, *Husserl on Axiomatization and Arithmetic*, provides an additional criticism of the supposed kinship between Husserl and Frege, on one hand, and between Husserl and Brouwer, on the other hand. In particular, the author shows in which way Husserl turned from a resolutely anti-axiomatic position – in the *Philosophy of Arithmetics* – to an original axiomatic position, which connects him to his colleague at the university of Göttingen and "Brouwer's opponent, David Hilbert" (p.48). "In this case" however, as Ortiz Hill remarks, "it is important to remember that Husserl developed his ideas independently of Hilbert" (p.66). So, as a summary of her article and as a suggestion for future research in phenomenology and philosophy of mathematics, the author claims that "[n]ow that we have the material we need to piece together Husserl's theory, we need to give it a try. It needs to be tested to see whether it is tenable" (p.68).

Intuition in Mathematics: on the Function of Eidetic Variation in Mathematical Proofs is the title of the fourth chapter, by Dieter Lohmar. After having briefly presented "the basic features of Husserl's theory of knowledge" (p.75), Lohmar focuses first on the fundamental phenomenological notion of "categorial intuition" and then on a "special case" of it, the so-called "eidetic method" or "intuition of essences" (*Wesensschau*), which is moreover characterized by apodictic evidence. With respect to this, he rejects the view according to which phenomenology would be a "variant of the Platonic theory of ideas" (p.78). Then, Lohmar takes into consideration the – both explicit and implicit – presence and bearing of the analysed eidetic method in the domain of mathematical proofs: in the "material mathematical disciplines", first, and in the "formal-axiomatic contexts" then. The outcome of such an examination is that, according to Lohmar, not only in the former but "[e]ven in formal contexts the evidence of the proof rests on an implicit variation and gains its special apodictic evidence from this source" (p.90).

Jaakko Hintikka is the author of the fifth chapter whose title – *How can a Phenomenologist have a Philosophy of Mathematics?* – sounds like a further variant of the opening question brought up by Hartimo in the volume's introduction. Hintikka holds that "one way of looking for the wellsprings of Husserl's theory of mathematics is to examine his notion of intuition or *Anschauung* and related concepts" (p.94). By so doing, Husserl's views are compared with those of others important authors such as Mach, Russell, and Wittgenstein. Furthermore, the author argues that there is a sort of "non-elective affinity" (p.96) between Husserl's concept of intuition and the Aristotelian perspective, in which, according to Hintikka, "some of the central Husserlian ideas find a natural niche" (p.95). Finally, the author examines the problem of the possibility of intuition of completely abstract and/or infinite mathematical structures, with regards to Gödel and to what Hintikka calls the "Husserl-Hilbert idea" (p.103), or the "structuralist conception of mathematics" (p.101), that is the idea of a "general theory of all structures" (p.100), a "vision of a universal 'structure of all structures' or 'model of all models'" (p.101).

The Development of Mathematics and the Birth of Phenomenology, by book's editor Mirja Hartimo, is probably the chapter that shows the most historical approach. The author highlights the importance of Karl Weierstrass – Husserl's teacher at the University of Berlin – not so much for Husserl's philosophy of mathematics as for his general philosophical approach. Indeed, as the author describes in detail, Husserl moved, "following the mainstream mathematicians" (p.108), from his early works' Weierstrassian genetic philosophy of mathematic to a "modern axiomatic view" (p.108). Nonetheless and "despite of his changing view of mathematics" (p.111), according to Hartimo, "in his inspiration to ground mathematics by means of insight" (p.120) "Husserl remained Weierstrassian for the rest of his life" (p.111). Then the author examines the outcome of Husserl's axiomatic and phenomenological approach, with respect to the *Logical Investigations* and to the crucial notion of "categorial intuition" there developed, and finally discusses, also with reference to other chapter of the volume, in which terms Husserl's philosophy could be considered as a kind of "Platonism".

In his *Beyond Leibniz: Husserl's Vindication of Symbolic Knowledge*, Jairo José da Silva "want[s] to show how Husserl dealt with the problem of imaginary elements and symbolic knowledge in mathematics and the central role it played in his philosophical development" (p.124). After having followed the handling of the symbolic knowledge problem in Husserl's early writings – mainly in the *Philosophy of Arithmetics* – and what da Silva calls the "earlier and later treatment" which Husserl gives to the matter of the imaginary elements in mathematics, the author provides some critical considerations and "some final comments on the *correctness* of Husserl's vindication of symbolic knowledge, in particular his treatment of imaginaries" (p.141). The heart of these critical comments lies in the consideration that Husserl's treatment of both issues was too cautious and too worried about "securing mathematics" (p.141), while, according to da Silva, "[w]e must let mathematicians do their work; no matter how inapplicable a formal theory may be, if it is consistent, it is the theory of a mathematical *structure* and time will decide if it is sufficiently interesting to survive" (p.141).

With his paper, *Mathematical Truth Regained*, Robert Hanna puts forward, after having analysed some of what he calls "negative or skeptical solutions" (p.151), a new and original "*positive* or anti-skeptical solution" (p.155) to Benacerraf's dilemma. This new solution, which Hanna calls a "*Kantian phenomenological solution*" (p.149) and which he vindicates throughout the paper, is grounded on the combination of a "standard semantics of mathematically necessary truth […] based on Kant's philosophy of arithmetic" with a "reasonable epistemology of mathematical knowledge […] based on the phenomenology of logical and mathematical self-evidence developed by early Husserl […] and by early Wittgenstein" (p.149).

On referring to Gestalts, by Olav K. Wiegand, concludes the volume by confronting two tasks: it sketches "the philosophical motivation for what [the author has] called mereological semantics (MS)", in a previous paper published in 2007, and it comments "from the point of view of this background philosophy — on some philosophical aspects of an ongoing debate on the nature of relations" (p.183). Thus, Wiegand provides a formalization of the notion of Gestalt, which he calls "structured whole" and focuses, in particular, on one specific sort of structured wholes which he designates as "R-structured wholes". The mentioned "philosophical motivation" of Wiegand's mereological semantics "leans heavily on the work of Aron Gurvitsch", which "combined the tenets of Gestalt theory with that of phenomenology, and conceived of objects as structured wholes" (p.185).

The volume collects outstanding contributions, with distinct "combinations" of historical and systematic issues of great importance – both for philosophy of mathematics and for phenomenological research – which although all independent and autonomous, nonetheless produce a dynamic, yet not univocal, framework of mutual references about a series of topics, such as mathematical Platonism, intuitionism, axiomatization, mathematical structuralism etc. The only defect could maybe lie, at least if one considers the book's title, in the nearly exclusive attention given to the Husserlian version of phenomenology. Otherwise the volume presents itself as an excellent resource. An index is also provided at the end of the book.

More reviews of this volume
http://www.tandfonline.com/doi/abs/10.1080/01445340.2011.565184

Website
http://www.springer.com/philosophy/philosophical+traditions/book/978-90-481-3728-2