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Title of Collection: New Essays on Peirce's Mathematical Philosophy

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Abstract: This is a collection of new essays on Charles Sanders Peirce's philosophy of mathematics. Peirce is widely regarded as one of the greatest philosophers America has yet produced. The inventor of pragmatism, Peirce is also a seminal figure in the development of modern logic, famed for his discovery (independently of Frege) of the quantifier, and for his pioneering work on the logic of relations. His searching investigations in the "logic of science" have profoundly influenced subsequent work in epistemology and the philosophy of science, and his semiotics (theory of signs) has had a similar impact on the philosophy of language, and also on linguistics and literary theory. Peirce's philosophy of mathematics, by contrast, has received relatively little attention, despite its centrality to his thought, and the depth of his insights into the perennial problems of the subject. Peirce's mathematical philosophy is of interest both to Peirce scholars and to philosophers of mathematics. In this volume, eleven philosophers look afresh at this neglected but vital dimension of Peirce's thought. The essays are wide-ranging in their coverage, with in-depth discussions of such topics as: Peirce's mathematical ontology; his account of mathematical objectivity; pragmatism as a philosophy of mathematics, in comparison with the standard approaches to the subject; imagination and hypothesis-making in mathematics; Peircean semiotics and mathematical practice; the place of mathematics in Peirce's general theory of inquiry; Peirce's theory of the continuum, reconstructed in terms of category theory and in terms of the "absolute arithmetic continuum"; Peirce's mathematical and philosophical analyses of topology; his reading and interpretation of Cantor's set-theoretic writings. Peirce was truly a mathematical philosopher. He was

himself a first-rate mathematician, the most gifted son of Benjamin Peirce, the foremost American mathematician of the time; he often made his philosophical points by means of mathematical arguments and examples; and he believed that philosophy must begin with logic, which rests in turn upon mathematics. Moreover, many of his central concepts—most notably that of continuity—are as much mathematical as they are philosophical. For all of these reasons we cannot fully understand Peirce's philosophy unless we come to grips with the mathematical dimensions of his thought. Peirce was also an original and important philosopher of mathematics. He was, along with Frege and Hilbert among others, one of the founders of the fields of mathematical logic and foundations of mathematics. His philosophy, like Frege's and Hilbert's, grew out of and was informed by his experience as a professional scientist. Unlike Frege and Hilbert, Peirce saw as his primary task the development of a comprehensive metaphysical and epistemological system. He offers distinctive solutions, within the context of that system, to the main problems in the metaphysics and epistemology of mathematics. Peirce's theory of diagrammatic reasoning, formalized in his innovative system of Existential Graphs, provides a persuasive account of how we acquire mathematical knowledge. His distinction between theorematic and corollarial reasoning, a by-product of his theory of diagrammatic reasoning, bears directly on vexed questions about computability and incompleteness, and about the informal character of mathematical knowledge. On the metaphysical side, Peirce offers a sophisticated and nuanced account of the objects of mathematics, such as numbers and sets.

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