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Introduction to the English translation of "Il significato della critica dei principi nello sviluppo delle matematiche" by Federigo Enriques.

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Abstract: In this article, Enriques focuses on the critique of principles and their role in the development of mathematics, a role whose analysis and understanding are inseparable from the adoption of a historical perspective. The questioning and reworking of fundamental concepts emerge as one of the essential components of mathematical progress, providing it with ever more refined and profound tools.

Keywords: Continuum, Enriques, foundations, geometry, imaginary numbers, infinitesimals, mathematical progress, Riemann surface.

Akshay Venkatesh, in the article "Human mathematics in the age of reasoning machines", published in this volume, recalls the relevance of Federigo Enriques' views when it comes to understanding, today, in light of the development of automated reasoning, what is truly and authentically human in mathematical thinking.

Enriques (Livorno, 1871-1946) is one of the most interesting and influential figures in the 20th-century philosophy of mathematics. A leading geometer and a member of the Italian school to which we owe much of the development of algebraic geometry in the first half of the 20th century, he devoted a significant part of his work to the history and philosophy of science.

The *Annals of Mathematics and Philosophy* plans to dedicate a special issue to him in the near future, which will provide an opportunity to give a more detailed account of the facets of his thinking and theoretical positions, as well as of his role in the epistemological debates of his time.

In anticipation of this special issue, we are publishing in this volume the translation of an article by Enriques to which Venkatesh refers: "Il significato della critica dei principi nello sviluppo delle matematiche" (The significance of criticism of principles in the development of mathematics), which first appeared in *Scientia* in 1912. In it, Enriques focuses on the critique of principles and their role in the development of mathematics, a role whose analysis and understanding are inseparable from the adoption of a historical perspective. The questioning and reworking of fundamental concepts emerge as one of the essential components of mathematical progress, providing it with ever more refined and profound tools.

Enriques carries out a conceptual and historical analysis of key moments in mathematics, from antiquity to the algebra and geometry of the late 19th and early 20th centuries, finally touching on subjects in which he was personally interested. He then uses this analysis as a basis for a critical examination of the ideas and theories of the time on mathematics: logic and axiomatic method; pragmatism; naturalism. The result is ultimately a rationalist and humanist attitude, in which the psychological moments of mathematical creation and understanding play an essential role.

I would like to express my sincere thanks to Arnaud Beauville and Sorin Dumitrescu for our discussions on Enriques' mathematics, which gave me a better understanding of the theoretical context of section VIII of the article: "The new developments in modern algebra".

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