

Editor's Introduction

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This volume includes four contributions in philosophical logic and the philosophy of mathematics from authors currently based in México, United Kingdom, United States, and Portugal. Two articles fall squarely within the philosophy of mathematics, and the other two lie at the interface between philosophical logic and metaphysics and epistemology, respectively.

Two influential papers by Paul Benacerraf have set the agenda for the philosophy of mathematics for more than forty years now. One of them, “What Numbers Could Not Be” (1963) focused on the ontology of mathematics and included a provocative argument to the conclusion that whatever numbers —and other mathematical objects— may be, they are not objects. While many agree that numbers cannot be identified with their set-theoretic surrogates, few are prepared to follow Benacerraf to the more radical conclusion that numbers are not objects. In “On the Essence and Identity of Numbers”, Mario Gómez-Torrente develops a novel argument for a more circumscribed conclusion: reflection on some of the essential features of the natural numbers suffice to disqualify their set-theoretic surrogates —and a great variety of other candidates— as being identical with them. However, unlike Benacerraf’s original line of thought, the new style of argument doesn’t rule all objects whatever as candidates for the identification; it merely sets a new set of constraints they should meet in order to be eligible for it.

The other landmark paper by Benacerraf, “Mathematical Truth” (1973) issued a different challenge for philosophers of mathematics. It argued, in particular, that extant accounts of mathematics cannot simultaneously do justice to the thought that the semantics for mathematical language ought to be continuous with the semantics for the rest of our language and provide a plausible account of our ability to acquire mathematical knowledge. While mathematical anti-realists of different stripes tend to do well with the second desideratum, they seem generally unable to accommodate the first thought. The problem for mathematical realists, however, is that while they seem to do well with the first desideratum, they seem unsuccessful when it comes to the second. Some forms of mathematical realism invite us to contemplate a separate realm of mathematical objects, which are epistemically accessible to us only to the extent to which we may be endowed with a peculiar faculty of mathematical cognition. María José Frapólli takes issue with all such forms of mathematical realism. Her aim in “Non-Representational Mathematical Realism” is to of-



fer a more palatable variety of mathematical realism, one which does without the postulation of a separate realm of mathematical objects.

The last two papers in the volume make contributions at the interface of philosophical logic and other areas of philosophy. One sets out to develop a conception of essence that can be used to establish a link between essence and necessity, whereas the other provides a classical response to Fitch's paradox of knowability.

The concept of essence has recently been called to play two different theoretical roles in metaphysics. One presupposes a layered picture of the world and calls for essence to figure in metaphysical explanations of higher-level facts, e.g., chemical, biological, social facts, in terms of more fundamental lower-level facts, e.g., microphysical facts. The other is to establish a link between essence and metaphysical necessity whereby metaphysically necessary truths obtain in virtue of truths concerned with the essence of objects. In "Essence without Fundamentality," Agustín Rayo doubts whether a single conception of essence can profitably be expected to perform both roles, and he offers an alternative characterization of essence in terms of a primitive "no-difference" propositional operator " $\phi \equiv \psi$ " read: "there is no difference between it is being the case that ϕ and it is being the case that ψ ". His elegant characterization of essence requires no judgements whatever as to what is more fundamental, but it is nevertheless well suited to establish the desired link between essence and metaphysical necessity.

The fourth and final paper in the volume develops a classical response to Fitch's paradox of knowability on behalf of a certain sort of semantic anti-realism according to which there is an intimate link between the truth of a sentence and our recognition of it. Fitch's paradox is traditionally taken to be the observation that we can classically move from a regimentation of the claim that all truths are knowable to the unpalatable claim that all truths are known. Different philosophers respond differently to the observation. Some take it to place a limitative result on knowability, whereas remain unmoved and point to some allegedly independent motivations for a retreat to intuitionistic logic. The problem is that neither move seems available to the semantic anti-realist. Indeed, in "Truth, Demonstration and Knowledge: A Classical Solution to the Paradox of Knowability," Elia Zardini explains how to motivate a restricted version of an appropriately qualified knowability principle for a fixed language. While semantic anti-realists are committed to all instances of the principle corresponding to simple sentences of the language, they need not commit themselves to the problematic instances involved in Fitch's paradox.

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