REVIEWS

José Ferreirós, "Lógica, conjuntos y logicismo: desarrollos alemanes de 1870 a 1908," *Mathesis* **X**, no. 3 (August 1994), 255–272.

Reviewed by

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This paper aims to show that Richard Dedekind's view on the relationships between mathematics and logic is correctly classified as *logicism* according to the criteria used in the second half of the last century.

The central notions of Dedekind's system in his famous *Was sind und was sollen die Zahlen?* (1888) were class and application, and Ferreirós argues that they are logical notions by the standards of that time. The basic logical notion used by tradition was *concept* and the notion of class can easily be seen as the extensional counterpart of concept. What can we say about application? As the end of the XIXth century, applications began to be considered as some some kinds of relations (and relations as some kind of classes).

It is well known that Frege developed the foundations of arithmetics on the logical notions of *concept* and *relation* and that the afterwards troublesome *Law V* — an unrestricted principle of comprehension — allowed us to go from intensions to extensions. Seen in this way, Fregean and Dedekindian approaches to the foundations of mathematics are two sides of the same logicist coin. Ferreirós also argues that from this perspective, it is easier to understand the central rôle played by set theory in the development of logicism and to explain why set-theoretical

paradoxes were interpreted as a threat to logic.

The paper throws some light on the origins of modern logic and helps us to understand the fate shared by logic and set theory — and so to logic and mathematics — during this relevant period.

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Miguel Espinoza, "El desmigajador de la realidad: Wittgenstein y las matemáticas," *Mathesis* **X**, no. 2 (May 1994), 171–186.

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In this thought-provoking paper, Wittgenstein's philosophy of mathematics is explained and criticized. Wittgenstein's view is classified as anthropocentric constructivism and also as empiricism or behaviorism. Espinoza asks: "¿Cómo no calificar de empirismo o de conductismo la idea de que el significada de un concepto sea dado por la práctica, por la acción o por su uso?" (p. 174). It is probably not *behaviorism* but the *pragmatisim* label which goes better with Wittgenstein's philosophy of mathematics. In any case, it is true that Wittgenstein denies that numbers have an essence and that there is a mathematical reality outside of and apart from the use we make of it. Espinoza argues that Wittgenstein's thesis of linguistic games has the effect of destroying mathematical unity and coherence and thus one of the roots or features of interest that mathematics has for our system of knowledge.

Espinoza considers that, for Wittgenstein, mathematics is essentially algorithmic and that this can be seen in the importance he attaches to proofs, The author stresses the similarities between Wittgenstein and Brouwer regarding their philosophies of mathematics and shows how Brouwer's view is deeper than Wittgenstein's. The philosophy of mathematics favored by Espinoza is *realism*, the thesis that mathematical objects are independent of our minds. From this point