The Pre-History of Mathematical Structuralism

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ABSTRACT:

Since the 1960s, there has been a vigorous and ongoing debate about structuralism in English-speaking philosophy of mathematics. But structuralist ideas and methods go back further in time, i.e., there is a rich pre-history to this debate, also in the German- and French-speaking literature. In the present collection of essays this pre-history is explored in a two-fold way: first, by reconsidering various mathematicians in the 19th and early 20th centuries (from Grassmann, Dedekind, Pasch, and Klein to Hilbert, Noether, Bourbaki, and Mac Lane) who contributed to structuralism in a methodological sense; second, by reexamining a range of philosophical reflections on such contributions during the same period (also by Peirce, Poincaré, Russell, Cassirer, Bernays, Carnap, and Quine), including suggestions about logical, epistemological, and metaphysical aspects that remain relevant today. Overall, the collection makes evident that structuralism has deep roots in the history of modern mathematics, that mathematical and philosophical views about it are often closely intertwined, and that the range of philosophical options available in this context is significantly richer than a narrow focus on current debates may make one believe.

KEY WORDS:

Mathematics, philosophy, structuralism, structure, methodology, metaphysics, nineteenth century, twentieth century, eliminative, non-eliminative