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LOGIC, MATHEMATICS, ONTOLOGY. ALFRED NORTH WHITEHEAD'S EARLY WORK

FOREWORD

> "*Logic, properly used, does not shackle thought. It gives freedom, and above all, boldness.* Illogical thought hesitates to draw conclusions, because it never knows either what it means, or what it assumes, or how far it trusts its own assumptions, or what will be the effect of any modification of assumptions."
>
> (Whitehead, *The Organization of Thought in The Aims of Education*, p. 118)

During the last few years, Whiteheadian scholarship has made undeniable progress in Western as well as in Eastern countries. Nevertheless, we cannot but notice that usually Whiteheadian studies mostly focus on the periods of Harvard and London and only in a much thinner proportion on Whitehead's first period in Cambridge. More precisely, current researches often pay more attention to Whitehead's philosophical developments than to his technical work in logic, mathematics and physics, which, except for very specific bits, tend to be relegated to chapters in history books. Insofar as some of his contributions to these fields are now a bit outdated, Whitehead seems now to be considered as being mainly a philosophical author.

In this context, devoting a whole volume to Whitehead's scientific works is not only legitimate, but also exceptional and relevant. Seven papers have been gathered around Whitehead's contributions in logic, mathematics and physics, as well as in philosophy of sciences. The papers do not only concern the early period of Cambridge but actually refer to Whitehead's work till 1929. Thus, one will find here insightful approaches of the debates in which Whitehead got involved, debates raising at that time on numerous issues like the nature of mathematical knowledge, its relation to symbolic logic, the status of internal relations or the theory of gravity.

Let us say few words about the papers presented in this volume:

Jacques Riche focuses on *A Treatise on Universal Algebra* in which Whitehead analyzes the possibility of embracing all systems of formal reasoning — including geometry — under the form of an algebra of symbolic logic

based on the previous works of Grassmann, Hamilton and Boole. The author also shows how these questions will reappear few years later in the *Principia Mathematica*.

Rosen Lutskanov examines the role played by the same *Treatise* in the development of philosophical concepts about the nature of the mathematical knowledge. The aim of his paper is to situate the *Treatise* in the history of the development of formalism as an intermediary between the formalism of Peacock and the one of Hilbert.

Jean-Pascal Alcantara compares Whitehead's position on internal relations with the criticisms that were levelled at them by Russell and Moore. This paper is also an attempt to determine whether Whitehead's philosophy of organism can be understood as a reenactment of the Leibnizian doctrine of internal relations.

Bruno Leclercq contrasts Whitehead's and Russell's philosophical projects when working together on the *Principia Mathematica* by analyzing the former's epistemological aims in his paper "On mathematical concepts of the material world" and the latter's aims in his contemporary text "On denoting".

Sébastien Gandon investigates the often forgotten theory of magnitude built by Russell and Whitehead in the last published part of *Principia Mathematica*. He also questions the place the quantitative theory of numbers in the logicist project.

Sébastien Richard studies the key-moments of the development of what Whitehead calls mereotopology, namely in 1916, 1919 and 1929. Then, he questions the relation of that theory with the project of formal ontology in Husserl's work.

Eventually, *Ronny Desmet* presents the Whiteheadian theory of gravity and explains it as an alternative to the spatio-temporal structure of Einstein's special relativity. Ronny Desmet displays an element in Minkowski's theory that has been essential in Whitehead's developments: the analogy between gravitational relations and electrodynamic relations.

But, first of all, *Michel Weber*'s introductory paper provides some general clues on Whitehead's whole philosophical development by relating his later existential ontology to his former formal ontology, which is here under consideration.

Emeline Deroo and Bruno Leclercq