

## Preface

Two basic approaches have been used by researchers in studying the history of logic: the philological and the “retrospective-logical.” The first approach entails careful terminological examination of source materials, comparison of different variants of the same documents, and clarification of the relationships between the logical facts and the data from the science of language. The second approach reduces to analysis of older logical concepts in order to find elements of contemporary viewpoints, using contemporary logical apparatus as a thread of Ariadne for guidance through the labyrinth of past logical investigations.

While both these approaches have undeniable advantages, they also have disadvantages. Historians who use the philological approach risk reducing their study to a history of terminological innovation, while researchers using the retrospective-logical method run the risk of modernizing the material under investigation. This book attempts to combine both approaches to avoid undesirable excesses. In considering older logical theories, the author has tried to explain how they have affected the corresponding modern viewpoints and simultaneously to devote the requisite attention to philological aspects.

This book deals with the development of a number of ideas and attitudes in mathematical logic, covering the period from the Middle Ages to the beginning of the twentieth century.

Throughout its entire history, mathematical logic has been closely related to development of other sciences, and its own development has been affected by the state of scientific methodology (primarily mathematics).

Mathematical examination of the deductive part of classical Aristotelian logic is the distinguishing characteristic in the works of

the majority of the pioneers in the field of mathematical logic. The logical calculuses presented in these works are analogous to the well-known algebraic calculuses of Viète and Descartes. These early logical calculuses made use of two types of expressions, one called "subjects"; the other, "conclusions," "predicates," or "relations." When constant individual subjects were substituted for the corresponding variables in expressions of the second type, propositions characterizable by tests of truth or falseness were obtained. It was possible to use definite, rather simple rules reminiscent of the rules of arithmetic algebra to operate with propositions written in an artificial symbolic language.

Although the approach taken by Leibniz was not directly related to the requirements of the mathematics of his time, the proponents of this approach obtained individual valuable scientific results. His time also saw the actual ripening of an extremely fruitful notion in contemporary mathematics — the notion of a distributive structure, which must be dealt with in both logic and mathematics as well as in their applications to physics and other sciences. The appearance of this idea indicated a very deep penetration into the essence of logical and mathematical operations.

In conclusion, the author would like to take this opportunity to express his deep gratitude for helpful advice and consultation on special problems in mathematical logic and semiotics to Professor S. A. Yanovskaya first of all and then to the author's long-standing co-workers A. V. Kuznetsov, G. E. Kleynerman, V. K. Finn, and Docent Ye. K. Voyshvillo.