

## **Summary**

### **The Philosophy of Mathematics and Logic in the 1920s and 1930s in Poland**

The aim of this book is to present and analyze a number of philosophical concepts concerning mathematics and logic as formulated by Polish logicians, mathematicians and philosophers in the 1920s and 1930s. It was a remarkable period in the history of Polish science, in particular in the history of Polish logic and mathematics. At that time the Lvov-Warsaw School of Philosophy and Warsaw School of Logic were developed as well as the Polish School of Mathematics – they determined the further development of mathematics and logic as well as philosophy (in particular, analytic philosophy) in Poland and the results obtained then were most important in their appropriate domains. Therefore, it is justified to ask whether and to what extent the development of logic and mathematics was accompanied by a philosophical reflection. In particular one can ask the following questions: (1) was the research in mathematics and logic undertaken in Poland at that time connected with certain philosophical, methodological or epistemological concepts concerning those domains, (2) if not, then what were the “private” philosophical views and sympathies of these logicians and mathematicians and why did these views not influence their investigations in logic and mathematics, (3) if these logical and mathematical investigations were based on certain philosophical assumptions then what those assumptions were, (4) were the results obtained in mathematics and logic the starting point of formulating some philosophical concepts, (5) were there any original philosophical ideas concerning logic and mathematics formulated in Poland, (6) what was the attitude of Polish logicians and mathematicians towards main philosophical concepts in the philosophy of mathematics which had been formulated in the first half of the twentieth century, i.e., logicism, intuitionism and formalism.

We try to answer those questions by analyzing the works of Polish logicians and mathematicians who have a philosophical temperament as well as their research practice.

In Chapter 2, we consider representatives of Polish School of Mathematics: Waław Sierpiński, Zygmunt Janiszewski, Stefan Mazurkiewicz, Stefan Banach Hugo Steinhaus, Eustachy Żyliński and Leon Chwistek.

Chapter 3 is devoted to an analysis of the philosophical views of the representatives of the Lvov-Warsaw School of Philosophy: Jan Łukasiewicz, Zygmunt Zawirski, Stanisław Leśniewski, Tadeusz Kotarbiński, Kazimierz Ajdukiewicz, Alfred Tarski, Andrzej Mostowski and Henryk Mehlberg.

In Chapter 4 the representatives of Cracow centre of science are considered: Jan Sleszyński, Stanisław Zaremba and Witold Wilkosz.

To indicate the background of scientists being active in the 1920s and 1930s we consider in Chapter 1 some predecessors, in particular: Jan Śniadecki, Józef Maria Hoene-Wroński, Samuel Dickstein and Edward Stamm.

The analysis leads to the conclusion that Polish logicians and mathematicians in the 1920s and 1930s were interested in the philosophical issues concerning logic and mathematics. They were well-informed and knew the current tendencies and doctrines formulated in the philosophy of logic and mathematics quite well. They formulated various commentaries on logicism, intuitionism and formalism. They also formulated their own concepts but – and this is characteristic for them – they were convinced that mathematical and logical investigations should be independent of any *a priori* formulated philosophical assumptions. Mathematics and logic should be autonomous and neutral with respect to philosophy. Therefore, the commentaries on the philosophical issues were rather fragmentary and incomplete, mostly they concerned particular problems connected with actual technical investigations. Polish logicians and mathematicians did not attempt to formulate general philosophical concepts concerning logic and mathematics. Indeed, their philosophical remarks were usually formulated as comments about concrete technical results in logic and the foundations of mathematics. Sometimes these ideas were not quite consistent with research practice – for example, Tarski was a nominalist but in his investigations he used various infinitistic methods inconsistent with nominalism. In this way the philosophical views did not restrict the methods which were accepted and used in technical research. In fact, these philosophical views were treated by Polish logicians and mathematicians as private views that should not influence the technical work. When certain views were formulated, then various possibilities were considered and definite declarations avoided. A good illustration of this attitude is the problem of the controversial axiom of choice. There was no ideology and no definite philosophical concept that would form a basis for the development of logic and mathematics in Poland in the 1920s and 1930s.

In the Polish School of Mathematics a set-theoretical trend had been developed but it has a methodological and not a strictly philosophical character. In the Warsaw School of Logic, philosophy played an important

role – in particular certain concrete logical investigations were philosophically motivated, e.g., Łukasiewicz's many-valued logic or Tarski's semantic definition of truth. Nevertheless, when a logical problem was formulated then the philosophical motivation stopped playing any role and only technical logical research and the results obtained by any correct methods were important.

One should add that there were two exceptions to this pattern, namely L. Chwistek and S. Leśniewski – they were interested only in those logical problems, which were implied by their own philosophical views of the foundations of mathematics. Their philosophical views generated their interest in particular problems of logic or mathematics.

What were the sources of the described attitude of Polish logicians and mathematicians towards philosophy? They can be seen in the distinction between the research practice and the philosophical discussions concerning the foundations of mathematics and logic and also in the principle (postulated by K. Twardowski and Lvov-Warsaw School of Philosophy) of distinguishing between science and *Weltanschauung*. According to the latter, when one is engaged in research in a particular discipline then the philosophical issues connected with it become something like *Weltanschauung* and when a concrete philosophical problem is investigated then this should be done by scientific methods.

*Trans. by Beata and Rob Trapnell*