



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

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ROMAN MURAWSKI, *The Philosophy of Mathematics and Logic in the 1920s and 1930s in Poland*. Trans. by Maria Kantor. Basel: Birkhäuser, 2014. xii + 228 pp. Hardcover US\$139, 978-3-0348-0830-9; eBook US\$109, ISBN 978-3-0348-0831-6

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For a recent book about Alfred Tarski this reviewer needed to describe briefly and edit carefully some translations of Polish works on mathematical philosophy that lay outside his background in mathematics and beyond his comfort zone in Polish. The task would have been much easier had this new book by Roman Murawski been available. It would have given an overview of the landscape, suggested routes through some philosophical mazes, and helped relate some of those works to each other.

Reconstructed in 1918 after centuries of oppression by European empires, newly independent Poland had three major universities: Cracow and Lwów in the former Austrian partition, and Warsaw in the Russian. The first two had noted philosophical faculties already. Polish mathematicians and logicians collaborated to bring international acclaim to Poland in those fields and make Warsaw a world center for research in set-theoretic mathematics and mathematical logic. They succeeded brilliantly but suffered disaster in 1939 with the onset of World War II. Nevertheless, their achievement exerted major influence throughout the world, particularly through the formal-logic framework that was perfected during those two decades and became the standard basis not only for foundational studies in mathematics, but also for studies in various disciplines, such as computer science, that require detailed considerations of language and reasoning. This book tells the story of that development, through descriptions of the work of thirty Polish scholars.

The book spills over the boundaries in its title only slightly, mentioning some activity before and after the world wars. Chapter 1 is about the work of six scholars before World War I: Jan Śniadecki, Józef Maria Hoene-Wroński, Henryk Struve, Władysław Biegański, Samuel Dickstein, and Edward Stamm. Because Poland was partitioned and oppressed during those times, they had little direct connection with universities. Only the last two lived past 1920. Dickstein, in particular, exerted major influence through his work in publishing.

Chapter 2 features six members of the Polish school of mathematics whose work touched philosophy in limited but significant ways: Waclaw Sierpiński, Zygmunt Janiszewski, and Stefan Mazurkiewicz in Warsaw and Hugo Steinhaus, Stefan Banach, and Eustachy Żyliński in Lwów. Chapter 3 surveys the work of thirteen researchers from the Lwów–Warsaw school of philosophy: Kazimierz Twardowski, Jan Łukasiewicz, Zygmunt Zawirski, Stanisław Leśniewski, Tadeusz Kotarbiński, Kazimierz Ajdukiewicz, Maria Kokoszyńska, Alfred Tarski, Jan Drewnowski, Jan Salamucha, Henryk Mehlberg, Andrzej Mostowski, and Innocentius Maria Bocheński. Twardowski was the teacher of the six following him in that list; they, in turn, supervised the next four, and Tarski was Mostowski's teacher.

The works of five more scholars who do not fit neatly into this organization are surveyed as well: artist/logician Leon Chwistek and philosopher Benedykt Bornstein in Chapters 2 and 4, and in Chapter 5 Cracow mathematicians Jan Sleszyński, Stanisław Zaremba, and Witold Wilkosz, whose work on mathematical organization and exposition nicely ties up one of the notable themes of this book. Very brief biographical sketches are included for all thirty scholars. The book has a complete bibliography of items cited, and an index of persons mentioned.

In his introduction, Murawski suggests the following questions to guide readers. Was the research reported here driven by philosophical motivations? If so, in what way, and if not, why not? Was it the origin of some philosophical concepts? What were these scholars' attitudes toward the prevalent philosophical positions of their times? This review will also suggest further themes that structure the book.

Roman Murawski is head of the Department of Mathematical Logic at the Adam Mickiewicz University in Poznań.¹ The book under review is an enlarged translated edition of Murawski 2011. (Chapter 3 was expanded by considering the work of five more researchers.) The book extensively employs translated quotations from the original works of the scholars considered. For example, on pages 60–69 (randomly chosen), in addition to many short paraphrases there are fifteen displayed quotations; their original texts are included as footnotes, and constitute about sixteen percent of the text on those pages. As indicated below, those who need to read this material closely will want to consult the originals.

Before returning to a description of the meat of the book in a more positive tone, here are listed some criticisms of its execution, addressed mostly to future writers in this area and to their editors.

- *Translations of titles.* Some but not all titles of cited literature are translated. But for ease of reference, *all* original titles *and* their translations are necessary.
- *Dates in citations.* Often, the date specified for a cited work is that of a later edition. That hinders considering the chronology of ideas. Both dates are necessary.

The following items suggest that the book under review was not copyedited by someone sufficiently familiar with the subject and its context in English. The reviewer found many diction and syntax errors, some of which seriously hinder understanding, even reversing the meaning. All of the examples given below involve words commonly used in logic. The syntax examples all involve questions of sentence structure: word order affecting meaning, or connectives relating phrases or clauses within a sentence. In some cases, although the reviewer is not competent to analyze the Polish, he recognized that the English is seriously faulty; a less experienced reader might be led astray.

- *Errors in diction.* (1) On page 6, the phrase *laws of lengthiness* is unintelligible. (2) On page 29, *selectors* should be *selections*. (3) On page 44, Sheffer's stroke is not *disjunction*. (4) On pages 62 and 174, *postulated* should be *proposed*. (5) On page 205, *refuting the proposal to hold* should be *declining the offer of the position of*.
- *Errors in syntax.* (1) Pages 79, 82, 143, and 172 each contain expressions beginning with *Since*, followed by a single clause then a period. None of these expressions is intelligible. (2) On page 86, the German original of the last quotation included a colon to separate a complete sentence from a long adverbial phrase explaining it, but the translator used a period; standing alone, that phrase is unintelligible. (3) On page 122, *lack of precision and closeness* should be *closedness and lack of precision*. (4) On page 168 in the last paragraph, the expression *as if* is inserted as if it were an adverb; that made the sentence unintelligible. (5) On page 181, the phrase *work that makes the excellent development of these theories even more necessary* should be *work that the considerable development of these theories makes more and more necessary*.

¹ He is different from an author with the same name who has written much about Catholic liturgy.

In contrast, the many quotations from Kotarbiński 1966 in Section 3.5 are excellently presented—translated and edited by a team that Murawski does not acknowledge.

Several themes prevail throughout Murawski's book, and make it a coherent, effective introduction to those aspects of the philosophy of mathematics and logic that Poles introduced or helped spread worldwide. The themes are not all explicitly stated, but are clear to the reviewer. Readers should be able to use them as a guide through this survey, and compare them with the goals stated earlier:

- Insistence on *precision* in developing and describing mathematics and logic.
- *Acceptance* of all effective methods in obtaining results in logic.
- *Small philosophy*: detailed analysis of limited problems, rather than construction of all-encompassing philosophical systems.
- *Application* of the precise logical tools resulting from this research to diverse fields of inquiry.
- *Independence* of these tools from specific philosophical viewpoints.
- Emphasis on *exposition* of mathematics and logic using these principles.

Two trains of thought are distinguished by their *lack* of attention in this book. First, Murawski deemphasizes the work of Hoene-Wroński, Leśniewski, Chwistek, and Bornstein in constructing comprehensive philosophical systems. The reviewer agrees with his decision: they had relatively little impact. Second, there is an almost total absence of historical and social background, in spite of the contrary claim at the top of page x. This is unfortunate; readers may thus benefit from Davies 1982, Kuratowski 1980, Kuzawa 1968, McFarland et al. 2014, Watt 1979, and Woleński 1989.

The lack of cultural information and the frequency of editing errors are the only drawbacks to this book. The former may stem from reluctance to treat politically sensitive subjects. The latter is troubling because so many of the errors lie in exactly the area where the founders of mathematical logic were trying to instill precision.

From this book, the reviewer learned about scholarly work that he had not been aware of and interrelationships that he had found difficult to investigate. The consistency of the themes just listed is impressive, and one was really surprising: these scholars' emphasis, continuing from the earliest times, on precision and clarity in mathematical and philosophical exposition. Roman Murawski's book is a good way to learn about the general Polish influence on these disciplines.

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