

MR2896656 (Review) 03-02 03A05 03F52

**Girard, Jean-Yves** (F-CNRS-IML)

★**The blind spot.**

Lectures on logic.

*European Mathematical Society (EMS), Zürich, 2011. xiv+537 pp.*  
*ISBN 978-3-03719-088-3*

This book is based on the notes of a series of lectures given by the author at Università Roma Tre in 2004. It summarizes much of the author's contributions to proof theory over the past 35 years and its relationship to mathematics and mathematical logic. The main theme of this work is the inadequacy of classical logic and classical notions of truth to serve as a basis for realistic mathematics. It is for this reason that the author invented linear logic and oversaw the development of its various derivatives. Linear logic, in his view, can be seen as a logic that gives up the attempt to replicate reality perfectly in order to concentrate on what can be accomplished in specific situations. It thus manages to locate *the blind spots* which provide the title of this book: those classical notions, such as predicativity and infinite computability, which create philosophical problems that mathematicians tend to ignore. The book begins with a review of the basics of mathematical logic, with an emphasis on proof theory and Gentzen's sequent calculus. The author then proceeds to examine various functional interpretations of logic, the  $\lambda$ -calculus, type theory and category theory. This leads to a more detailed discussion of linear logic and its various manifestations. Included, among many other topics, are discussions of how linear logic relates to quantum physics, Hilbert spaces,  $C^*$ -algebras and von Neumann algebras. While this book is intended for more advanced readers, it is remarkably readable and parts of it are even accessible to beginners. The author manages to be entertaining, insightful, obtuse and controversial, all at the same time. His book is, as advertised on the back cover, highly original, and challenges mathematicians, computer scientists, physicists and philosophers to rethink their views and concepts about the nature of mathematical knowledge in an exceptionally profound way.

*Henry Africk*

© Copyright American Mathematical Society 2016