Perspectives on the History of Mathematical Logic, ed. Thomas Drucker, Birkhäuser, Boston-Basel-Berlin 1991, xxiv+195 pp.

Reviewed by

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This book is a collection of papers most of which were originally given in the special session on the History of Logic at the American Mathematical Society's meeting in Chicago in March 1985 (the papers included in the volume but not presented in the session are those by Dawson, Seldin, Wang and a second paper by Anellis). The volume is dedicated to the memory of Jean van Heijenoort. It fittingly begins with a short paper by Irving H. Anellis presenting van Heijenoort and his contributions to the history of logic.

The main part of the book opens with an Introduction written by the editor, Thomas Drucker. It contains a description of the included papers and the main principles around which the book is organized.

The papers are devoted to the history of mathematical logic in the last century. They do not give a complete history of this discipline but indicate some crucial points in its development and the richness of some of its ideas. As the editor writes in the Introduction: "They [the papers] involve technical details and philosophical underpinnings, support of colleagues and establishment of chairs. Some of the chapters give an insider's view of a particular development in the field, while others are detailed critical analyses of influential pieces of work. Their .common feature is making sense rather than magic out of advances, binding together a community of contributors rather than leaving the impression of isolated wonder-workers. As the motto of the international chess federation has it, *Gens una sumus.* (We are one people.)" (p. xvi)

The first paper is Judy Green's, "The Problem of Elimination in the Algebra of Logic" focussing on the discussion of the contributions of Boole, Venn, Ladd-Franklin and others to the solution of the elimination problem. This problem concerns the elimination of a logical variable from an equation or set of equations and is connected with the problem of recognition of valid syllogisms. The paper also offers the reader several important references to the relevant literature.

Describing an early contribution to mathematical logic is the paper "Peirce and the Law of Distribution" by Nathan Houser. It is based on the author's study of materials from the

archives of the Peirce Edition Project at Indiana University – Purdue University at Indianapolis and gives a good insider's look into the topic.

Two further papers are connected with B. Russell: "The First Russell Paradox" by Irving H. Anellis is based on material from the Russell archives at McMaster University. The author argues that Russell obtained his paradox much earlier than has been commonly assumed. The paper reveals how difficult it is to reconstruct the development of certain ideas in mathematical logic and how much depends on the materials used.

The second paper connected with the work of Russell is "*Principia Mathematica* and the Development of Automated Theorem Proving" by Daniel J. O'Leary. The author discusses the first major published works in automated theorem proving: the Logic Theory Machine of Nowell, Shaw and Simon (1956) and the work of Hao Wang (1958). Both were based on *Principia Mathematica* and had a profound effect on the development of automated theorem proving.

The second paper by Irving H. Anellis in this volume, "The Löwenheim-Skolem Theorem, Theories of Quantification and Proof Theory," is a study of the early years of proof theory. The author's main thesis is that "the impetus to the development of proof theory, and the competing quantification theories developed after 1931, is to be sought in the questions raised by Herbrand [in "Recerches sur la théorie de la démonstration" from 1930] in the attempt to clarify the concept of *being a proof* for a Hilbert-type quantification theory" (p. 71).

The volume also contains a block of three papers connected with K. Gödel and his ideas. John W. Dawson, Jr. in "The Reception of Gödel's Incompleteness Theorems" writes about the history of Gödel's famous theorems and the reactions of his contemporaries. The moral of this paper is the warning about the dangers of attaching single philosophical labels to ideas from logic.

Hao Wang, who spent a lot of time talking with Gödel in his later years, writes in his paper, "Gödel's and Some Other Examples of Problem Transmutation," about the phenomenon of the unexpected course of one task leading to another. It is illustrated by some examples from Gödel (connected with the unprovability of consistency) and from the author (connected with his movement from automated theorem proving which finally led to the negative solution of an interesting case of the Entscheidungsproblem).

The third paper of this set is by Craig Smoryński, "The Development of Self-Reference: Löb's Theorem." It presents the history of Henkin's problem and the search for its solution (Kreisel, Löb, Solovay and others).

A book on the history of mathematical logic cannot omit the phenomenon of intuitionism. It is represented here by a paper of Wim Ruitenburg, "The Unintended Interpretations of Intuitionistic Logic," where an overview of these interpretations is given. The author considers interpretations for propositional logic, realizability, Dialectica interpretation, interpretations for predicate logic as well as topoi. The paper concludes with remarks on the quest for a correct interpretation of intuitionistic logic.

The book also contains four papers of a less technical nature. I refer to William Aspray's article, "Oswald Veblen and the Origins of Mathematical Logic at Princeton" (where the role of extra scientific factors in the process of forming a scientific centre are explained); Stephen C. Kleene's story about writing his famous *Introduction to Meta-mathematics*; the paper by Jonathan P. Seldin, "In Memoriam: Haskell Brooks Curry" (where the importance of Curry's work both for logic and computer science is assessed); and the paper by Dirk Siefkes, "The Work of J. Richard Büchi" (which is supplemented with a list of Büchi's publications and a list of his doctoral students).

Though the aim of the book and the intention of the editor is not to give a full history of mathematical logic in the last century, it is a pity that some important parts of this history were not presented. There is for example, no paper devoted to the meaning and the role of the Polish school of logic between the Wars. The editor acknowledges that omission in the Introduction but the reasons given for it are not convincing.

In conclusion, this is an important book. It exposes the richness of ideas and view-points, the difficult and not always direct pathways taken in the development of mathematical logic in the last century, and the various factors which did and continue to affect that development.

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Ein Jahrhundert Mathematik 1890-1990. Festschrift zum Jubiläum der DMV, hg. v. Gerd Fischer/Friedrich Hirzebruch/Winfried Scharlau/Willi Törnig, Friedrich Vieweg & Sohn: Braunschweig/Wiesbaden 1990 (= Dokumente zur Geschichte der Mathematik; 6); X + 830 S, ISBN 3-528-06326-2.

Rezensiert von

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Die Deutsche Mathematiker-Vereinigung (DMV) feierte 1990 ihr hundertjähriges Bestehen mit einer ganzen Reihe von Veröffentlichungen, durch die nicht nur die