Jarmo PULKKINEN, *The Threat of Logical Mathematism: A Study on the Critique of Mathematical Logic in Germany at the Turn of the 20th Century* (Frankfurt am Main/Berlin/Bern/New York/Paris/Vienna, Peter Lang GmbH, 1994)

*W.V. QUINE, *Selected Logic Papers* (Cambridge, MA, Harvard University Press, enlarged edition, 1995)

*Ansgar RICHTER, *Der Begriff der Abduktion bei Charles Sanders Peirce* (Frankfurt am Main, Peter Lang, 1995)

N. SHANKAR (editor), *Metamathematics, Machines, and Gödel's Proof* (Cambridge, Cambridge University Press, 1994)

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Raymond M. SMULLYAN, *Diagonalization and Self-Reference* (New York/Oxford, Oxford University Press, 1994)

Alfred TARSKI (edited by Jan Tarski), *Introduction to Logic and to the Methodology of the Deductive Sciences* (New York/Oxford, Oxford University Press, 4th ed., 1994)

*Nicla VASSALLO, *La Depsicologizzazione della Logica. In confronto tra Boole e Frege* (Milaon, FrancoAngeli, 1995)

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BIBLIOGRAPHIC NOTES

by

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W. S. ANGLIN & J. LAMBEK, *The Heritage of Thales* (New York/Berlin/Heidelberg/London/Paris/Tokyo, Springer-Verlag, 1995). A general expository, but incomplete, history of mathematics which gives consideration to several topics in the history of logic, including a proof of Gödel's incompleteness theorem(s) and a discussion of their implications and the elements of category theory.

Kirby A. BAKER, *Bjarni Jónsson's contributions in algebra*, Algebra Universalis **31** (1994), 306–336. A review of Jónsson's contributions to algebra, including his work on Boolean algebras and on relational structures for algebras.

J. L. BELL, *Type Reducing Correspondences and Well-orderings: Frege's and Zermelo's Constructions Re-examined*, Journal of Symbolic Logic **60** (1995), 209–221. Except for the briefest historical remarks, the author is primarily concerned to carry out his own construction of the type-reducing correspondence between second-level and first-level objects in order to prove well-ordering rather than to re-examine either Frege's construction in his development of arithmetic in the *Grundlagen* of type reduction between *concept* and *number* or Zermelo's construction of the type-reducing correspondence between *set* and *member* in his 1904 proof, using axiom of choice, of the well-ordering theorem.

Margherita BENZI, *Dubbiezze e controversie: Il dibattito su logica e probabilità in Italia nei primi anni del Novocento*, Historia Mathematica **22** (1995), 43–63. Outlines Italian work on foundations and axiomatization of probability theory between the First and Second World Wars and notes the belief of those working in the field at that time that logic would resolve outstanding questions in probability theory.

Terry BOSWELL, *Historical reflections on the logical analysis of quasi-definite descriptions*; abstract, Bulletin of Symbolic Logic **1** (1995), 226–227.

Nino B. COCCHIARELLA, Review of Peter Øhrstrøm and Per Hasle, "A. N. Prior's Rediscovery of Tense Logic", Journal of Symbolic Logic **60** (1995), 347–348. (See the entry below for Peter Øhrstrøm and Per Hasle.)

Leo CORRY, *La teoría de las proporciones de Eudoxio interpretada por Dedekind*, Mathesis **10** (1994), 1–24. The author describes Dedekind's interpretation of Eudoxus' theory of proportion, from the standpoint of Dedekind's work on irrational numbers.

Joseph W. DAUBEN, *Searching for the glassy essence: Recent studies on Charles Sanders Peirce*, Isis **86** (1995), 290–299. This is an "essay review" of three major recent (1993 and 1994) volumes of studies on Peirce's philosophy, of Joseph Brent's 1993 biography of Peirce, and of two recent collections of Peirce's papers, namely *Reasoning and the Logic of Things: The Cambridge Conferences Lectures of 1898* edited by Kenneth Laine Ketner, with an *Introduction* by Ketner and Hilary Putnam (1992), and volume 5 of the Peirce Edition Project's *Writings of Charles S. Peirce: A Chronological Edition* (1993), which Dauben places within the wider framework of Peirce scholarship. Of special interest to historians of logic and historians of mathematics is Putnam's *Introduction* to *Reasoning and the Logic of Things.* After noting that the author of one of the philosophical studies under review gives "only relatively scant" consideration to Peirce's mathematical work — and noting that much of Peirce scholarship has failed to take into serious account Peirce's work in logic and mathematics, Dauben notes (p. 294) that "[T]aking Peirce's mathematics and logic seriously is exactly what Hilary Putnam does" in his *Ntroduction* to *Reasoning and the Logic of Things.*

William DEMOPOULOS, *Frege and the rigorization of analysis*, Journal of Philosophical Logic **23** (1994), 225–245. Argues that Frege's efforts beginning with the *Begriffsschrift* were aimed at establishing arithmetic's autonomy from geometry.

William DEMOPOULOS, *Frege, Hilbert, and the conceptual structure of model theory*, History and Philosophy of Logic **15** (1994), 211–225.

Randall R. DIPERT, Review of Joseph Brent, *Charles Sanders Peirce: A Life*, Journal of Symbolic Logic **60** (1995), 348–352. The reviewer discusses why logicians might be interested in a biography of Peirce by briefly outlining Peirce's contributions to logic, and then notes that the Brent biography is more concerned to portray Peirce's personality than to examine Peirce's work within a biographical context.

Adam DROZDEK, Review of *Intuitionismus*, D. van Dalen (ed.), Studia Logica **54** (1995), 423–424. A review of Dirk van Dalen's edition of the first (1992) publication of the text of Brouwer's 1927 "Berlin Lectures" and the extant parts of Brouwer's planned, but never completed, book *Theory of Real Functions*.

Solomon FEFERMAN, *Gödel's Dialectica interpretation and its two-way stretch*, Computational Logic and proof theory, Brno, 1993, Lecture Notes in Computer Science **713** (Springer, 1993), 23–40. History and exposition of Gödel's *Dialectica* interpretation and sketch of recent work on proof theory using the *Dialectica* interpretation as a tool of investigation, especially for consistency proofs. Among other things, it is shown that folklore asserting that Gödel studied Gentzen's consistency proof of arithmetic is indeed fact.

José FEREIRÓS, *"What Fermented in Me for Years": Cantor's Discovery of Transfinite Numbers*, Historia Mathematica **22** (1995), 33–42. It is argued that Cantor's work in set theory, and especially the development of the theory of transfinite numbers, arose from Cantor's efforts to prove the Cantor-Bendixson theorem and from Cantor's interactions with Dedekind in 1882.

Miriam FRANCHELLA, *Griss's contributions to intuitionism*, in Philosophy of Mathematics (Kirchberg am Wechsel, 1992), Schriftenriehe Wittgenstein-Gesellschaft **20**, nr. I (Wien, Hölder-Pichler-Tempsky, 1993), 119–126. Examines the connections between Griss's philosophy and his criticisms of Brouwer's withint the context of Griss's version of intuitionistic mathematics.

Kurt GÖDEL (Edición a cargo de Francisco Rodríguez Consuegra, Prólogo de W. V. Quine), *Ensayos inéditos*, Madrid, Biblioteca Mondadori, 1994).

Jaakko HINTIKKA, *Carnap's work in the foundations of logic and mathematics in a historical perspective*, Synthèse 93 (1992), 167–189. Examines Carnap's contributions to mathematical logic from the standpoint of philosophy within a historical perspective.

Edmund HUSSERL (Dallas Willard, translator), *Early Writings in the Philosophy and Logic of Mathematics* (Dordrecht, Kluwer Academic Publications, 1994). Husserl's *Philosophie der Arithmetik* (1891) advocated psychologism in mathematics. Husserl (1859–1938), if he is known to historians of logic at all, is best known for his critical review (1891) of Schröder's *Vorlesungen über die Algebra der Logik* and for his role in the controversies between Frege and Hilbert (1891-94). He broke off his correspondence with Frege when Frege reviewed his *Philosophie der Arithmetik*, and resumed it again (1906) to engage Frege in a debate on the role of axioms in geometry, with Husserl defending the position that geometry depends on its axioms but must have a deductive structure. His attacks on psychologism led him to draw a distinction in his *Logische Untersuchungen* (1900-1901) between philosophical logic and mathematical logic and thereby exhibits some similarities between his post-psychologistic phenomenology and Hilbert's formalism. Willard is a well-known advocate and translator of Husserl's work; he published an English translation of Husserl's review of Schröder's *Vorlesungen* in *The Personalist* **59** (1978), 115–143.

David JERISON and Daniel STROOCK, *Norbert Wiener*, Notices of the American Mathematical Society **42**, no. 4 (1995), 430–438. Sketches Wiener's many contributions to mathematics. The authors note (p. 430) in connection with Wiener's Harvard Ph.D. thesis comparing Schröder's algebraic logic to the *Principia* system that Wiener 'claims to have found the work easy, but also admits that later "under Bertrand Russell in England, I learned that I missed almost every issue of true philosophical significance",' and adds that Wiener 'credits Russell with persuading him to learn some more genuine mathematics'.

René LALEMENT, *Computation as Logic*, Englewood Cliffs, N.J., Prentice Hall, and Paris, Masson, 1993. Although this is primarily an exploration of the practical and theoretical connections between mathematical logic, computer science, and programming, it also considers the historical connetions between these fields. The present book is an English translation of the French original published in 1990.

Julia KNIGHT, *In memoriam: Christopher John Ash*, Bulletin of Symbolic Logic **1** (1995), 202.

Larisa MAKSIMOVA, *On some aspects of the history of modal logics*; abstract, Bulletin of Symbolic Logic **1** (1995), 212–213.

A. W. MOORE, *A brief history of infinity*, Scientific American **272** (No. 4, April 1995), 112–116. A brief popular account of the history of infinity and philosophical attitudes towards infinity, from Zeno to Cantor. The chief concern is to consider "how Cantor's results bear on traditional conceptions of infinity." Concludes by arguing that "the diagonalization used in establishing Cantor's theorem also lies at the heart of Austrian mathematician Kurt Gödel's celebrated 1931 theorem. Seeing how offers a particularly perspicuous view of Gödel's result."

Roman MURAWSKI (red.), *Filozofia matematyki: Antologia tekstów klasycznych* (Poznań, Wydannictwo Naukowe UAM, 1994). This is a collection of Polish translations of classical writings or selections from the more important writings on philosophy of mathematics. It is in many respects comparable (in the best sense) to the first edition of Benacerraf and Putnam's *Philosophy of Mathematics: Selected Readings*, but is chronologically more wide-ranging, with material from ancient times (Plato, Aristotle, Euclid, Proclus), the seventeenth and eighteenth centuries (Descartes, Pascal, Leibniz, Kant), and modern times, including John Stuart Mill. Selections from modern times which will be of most interest to *Modern Logic* readers are from Bolzano, Cantor, Frege, Russell, Poincaré, Brouwer, Heyting, Hilbert, and Bernays. We should note that

"Millsian" philosophy of mathematics rarely receives attention in the Anglo-American treatments of philosophy of mathematics. Many of the translations appear here for the first time and are the work of the editor himself. Headnotes by the editor introduce each of the authors whose works are included and added explanatory footnotes by the editor (signaled by the editor's initials) provide additional information or explanations.

Stefan MYKYTIUK & Abe SHENTIZER, *The evolution of . . . : Four significant axiomatic systems and some issues associated with them*, The American Mathematical Monthly **102**, no. 1 (January 1995), 62–67. The axiomatic systems sketched are "Greek axiomatics and Euclid's geometry;" hyperbolic geometry, with particular reference to Lobachevsky, and a bare mention of Klein's Erlanger Programm; Peano's axioms, and **ZF**, with a reference to CH. The treatment received, e.g. by 'Peano's axioms and "the greatest intellectual discovery of the 20th century",' by which the authors mean Gödel's incompleteness results, is historically imprecise and may have been based either upon a cursory and inattentive reading of the sources, or on a reading only of questionable secondary studies. The authors state that Gödel's incompleteness results give "a remarkable insight into the nature of the system of Peano's axioms," whereas we know that Gödel states explicitly that he is dealing with "the most comprehensive formal systems that have been set up hitherto . . . the system of *Principia Mathematica*", of which Peano's axioms are a fragment, namely just the arithmetic axioms of PM, properly transcribed. They also credit Dedekind with achieving the first axiomatization of arithmetic in 1888, thus overlooking Peirce's 1881 *American Journal of Mathematics* paper "On the Logic of Number" which presents an axiom system which is equivalent to that of Dedekind.

Peter ØHRSTRØM and Per HASLE, *A. N. Prior's rediscovery of tense logic*, Erkenntnis **39** (1993), 23–50. Discusses the origins of Prior's work in tense logic and sketches his work on the subject in relation to his views on the nature of logic.

Charles PARSONS, *Platonism and mathematical intuition in Kurt Gödel's thought*, Bulletin of Symbolic Logic **1** (1995), 44–74. Descriptive account and explanation of Gödel's platonism with respect to mathematics, what it is and why he held the views that he did, including a discussion of the intellectual roots and development of Gödel's philosophical position in terms of intuition.

Joseph R. W. M. PICARD, *Impredicativity and turn of the century foundations of mathematics: Presupposition in Poincaré and Russell*, Ph.D. thesis, Massachusetts Institute of Technology, 1994. Abstract in *Dissertation Abstracts International 5A* (1994), 4126-A.

Conrad PLAUT, *Eating Humble Pi*: Review of *Humble Pi: The Role Mathematics Should Play in American Education* by Michael K. Smith, Notices of the American Mathematical Society **42** (no. 7, July 1995), 772–773. Not historical, but a *must read* for anyone concerned about mathematics education. Warns against the influential anti-mathematical and anti-intellectual attitudes and pseudo-mathematical misconceptions that the author is purveying among some educators and the American public at large.

Francisco A. RODRÍGUEZ CONSUEGRA, *Russell, Gödel and logicism*, in Philosophy of Mathematics (Kirchberg am Wechsel, 1992), Schriftenriehe Wittgenstein-Gesellschaft **20**, nr. I (Wien, Hölder-Pichler-Tempsky, 1993), 233–242. The author deals with the question of whether Russell understood Gödel's incompleteness results, the difference between theory and meta-theory and between axioms and inference rules, and denies that Gödel's incompleteness results led to the collapse of logicism.

Michael SEGRE, *Peano's axioms in their historical perspective*, Archive for History of Exact Sciences **48** (1994), 202–342. Places Peano's axioms within the context of the broader history of mathematics from the perspective of the development of the idea of mathematical rigor from ancient to modern times and in relation to comparable contemporary work, such as Dedekind's. Within this historical framework, Peano is seen to develop a clean and rigorous presentation of arithmetic rather than to mathematicize logic *à la* Boole.

J. R. SHOENFIELD, *The mathematical work of S. C. Kleene*, Bulletin of Symbolic Logic **1** (1995), 9–43. With a portrait of Kleene on p. 8. A survey which focuses almost entirely on Kleene's work in recursion theory.

Christian THIEL, *Friedrich Albert Langes bewundernswerte 'Logische Studien'*, History and Philosophy of Logic **15** (1994), 105–126. Assesses the *Logische Studien* of Friedrich Albert Lange (1828–1875), in which the validity and invalidity of syllogistic inferences is interpreted in terms of an analysis of the Gergonne-Euler relations between standard forms of propositions in assertoric syllogisms.

Dirk VAN DALEN, *Hermann Weyl's intuitionistic mathematics*, Bulletin of Symbolic Logic **1** (1995), 145–169. Examines Weyl's version of intuitionistic mathematics and shows where and how it differed from Brouwer's.

Přemysl VIHAN, *The last months of Gerhard Gentzen in Prague*, Collegium Logicum: Annals of the Kurt Gödel Society **1** (1995), 1–7. Uses the correspondence found in Paul Bernays' collection (located in the Bernays estate at the Eidgenössische Technische Hochschule in Zurich) to describe the last months of Gentzen's life in a Czech prison and establishes the facts of Gentzen's death. Translated by Jiří Velebil from the Czech original, "Zpráva o posledních měsících a dnech Gerharda Gentzena prožitých v Praze," Pokroky matematiky, fyziky a astronomie **38**, no. 5 (1993), 291-296.

N. Ya. VILENKIN (Abe Shenitzer, translator), *In Search of Infinity* (Boston/Basel/Berlin, Birkhäuser, 1995). A popular account of the history of the concept of infinity in mathematics and physics.

Jan WOLEŃSKI, Review of *Perspectives on the History of Mathematical Logic*, edited by Thomas Drucker, Studia Logica **54** (1995), 418–420. From the review: "This collection shows that the history of mathematical logic is full of several interesting small . . . as well as great . . . problems."