BIBLIOGRAPHIC NOTICES

by

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Francine ABELES, *Algorithms and mechanical processes in the work of Charles L. Dodgson*, in Charlie Lovett (editor), *Proceedings of the Second International Lewis Carroll Conference* (Winston-Salem, Lewis Carroll Society of North America, 1994), 97–106. Includes descriptions of algorithms developed by Carroll in various areas, including logic, designed with mechanical methods for solutions.

M. M. ARSLANOV, *Contributions to the history of variations of weak density in n–r.e. degrees*, in Dag Prawitz, Brian Skyrms & Dag Westerståhl (editors), *Logic, methodology and philosophy of science, IX (Uppsala, 1991)* (Amsterdam, North-Holland, 1994), 199–208.

Tadeusz BATÓG and Roman MURAWSKI, *Staisław Piątkiewicz and the beginnings of mathematical logic in Poland, Historia Mathematica* **23** (1996), 68-73. Gives a brief biography of Staisław Piątkiewicz (1849 - ?) and describes his book *Algebra w logice* [Algebra in Logic] (1888). Credit for introducing mathematical logic into Poland is typically given to Twardowski and especially to Twardowski's student Jan Łukasiewicz. The publication of *Algebra w logice*, however, makes Piątkiewicz the first to introduce mathematical logic into Poland.

Michael BEESON, *Constructivity in the nineties*, in *Philosophy of Mathematics* (Kirchberg am Wechsel, 1992), Schriftenriehe Wittgenstein-Gesellschaft **20**, nr. I (Wien, Hölder-Pichler-Tempsky, 1993), 127–144. A survey of recent work in constructive mathematics and computer science.

John BELL, *Infinitesimals and the continuum*, in James J. Tattersall (editor), *Proceedings of the Canadian Society for the History and Philosophy of Mathematics 19th Annual Meeting (Ottawa, Carleton University, 1993)*, 42–45. Includes a discussion of the revival of the use of infinitesimals in logic (nonstandard analysis) and category theory.

Unsigned [Paul J. CAMPBELL], *Review of Richard DEDEKIND, What Are Numbers and What Should They Be?, revised, translated, and edited by H. Pogorzelski, W. Ryan, and W. Snyder*, Mathematics Magazine **68** (no. 5, December 1995), 410. The reviewer notes that this translation is not strictly historically accurate; instead, the translators sought to render Dedekind's *Was sind und was sollen die Zahlen* into "modernized . . . notation and terminology" and omitted Dedekind's prefaces and footnotes in favor of their own. Moreover, as the reviwer also points out, 'the translators contend "that the true founder of the set-theoretic foundations of mathematics is Dedekind and not Cantor as many imagine" (the two met in 1872 and corresponded thereafter).' The reviewer also expresses surprise that there is no mention of or comparison with the 1901 Beman translation, reprinted by Dover in 1963. (We may add that historians of set theory and philosophy and foundations of mathematics who are familiar with the work of Charles Peirce might disagree that either Dedekind or Cantor alone should get full credit as founder(s) of the set-theoretic foundations of mathematics, since Peirce was an early and important contributor to this work, e.g. Peirce's 1881 paper "On the Logic of Number" published in the *American Journal of Mathematics*, in which Peirce defined natural numbers in terms of *finite set*.)

Lauro Frederico DA SILVIERA, *Peirce e matemática*, Bolema **3** (1994), 53–65. A consideration of Charles Peirce's philosophy of science in relation to mathematics.

William DEMOPOULOS, *Dummett on Frege's philosophy of arithmetic*, in James J. Tattersall (editor), *Proceedings of the Canadian Society for the History and Philosophy of Mathematics 19th Annual Meeting (Ottawa, Carleton University, 1993)*, 155–167. Examines the rôle of the context principle and the contextual definition of the cardinality operator in Frege's philosophy of arithmetic as expounded in Michael Dummett's *Frege, Philosophy of Mathematics*.

Keith DEVLIN, *Logic and Information* (Cambridge/New York/Melbourne, Cambridge University Press, 1995). This is the first paperback edition of this book first published in 1991.

E. A. ЕФИМОВА (E. A. EFIMOVA), *О работах В. Рассела по символоческому исчислению*, Историко-математические исследования **XXXV** (1994), 247-254. The work of developing a calculus of symbols for differential equations in the middle of the 19th century contributed to the growth of algebraic logic and abstract algebra. Here the author focuses on the work in the 1860s of William Russell in developing a symbolic calculus for differential equations.

H. B. ENDERTON, *In memoriam: Alonzo Church, 1903–1995*, Bulletin of Symbolic Logic **1** (1996), 486–488. This brief survey of Church's most important contributions of mathematical logic also includes a list of his doctoral students.

D. B. EPERSON, *Educating a mathematical genius: Alan Turing at the Sherborne School*, Mathematics in School (May 1994), 44–45. Reminiscences of Turing as a student in school from 1928 to 1931.

Paul ERNEST, *A note concerning Irving H. Anellis, "Distortions and discontinuities in mathematical progress: a matter of style, a matter of luck, a matter of time, . . . a matter of fact"*, Philosophica **50** (1992), 123–125. Ernest challenges Anellis's alleged contention that Jean van Heijenoort deserved the credit for priority of his proof of the completeness and soundness of the falsifiability tree method, arguing that Bell and Machover completed the manuscript for their 1977 textbook *A Course in Mathematical Logic* by 1974, and noting that as Machover's student he [Ernest] received copies of parts of the manuscript before the end of 1973 and had the entire manuscript by the end of March 1974; moreover, that the manuscript, in its final, corrected, form already contained a proof of the completeness and soundness of the tableau method and was ready for the publisher in 1974, but that the book did not appear until 1977 because of printing delays. Ernest tells us that Bell and Machover were "justifiably pleased" with their work, not because it contained any original results, but because it was an "excellent systematzation and presentation" of standard and routine material.

Ernest uses this opportunity to also argue that priority claims "are not only fruitless, but harmful".

Dagfinn FØLLESDAL, *Stig Kanger in memoriam*, in Dag Prawitz, Brian Skyrms & Dag Westerståhl (editors), *Logic, methodology and philosophy of science, IX (Uppsala, 1991)* (Amsterdam, North-Holland, 1994), 885–888.

Yvon GAUTHIER, *Hilbert and the internal logic of mathematics*, Synthèse **101** (1994), 1–14. Argues that Hilbert's program was inspired by Kronecker's finitism.

Hèléne GISPERT, *La théorie des ensembles en France avant la crise de 1905: Baire, Borel, Lebesgue . . . et tous les autres*, Revue d'histoire des mathématiques **1** (1995), 39–81. Discussion of the reception of Cantor's set theory in France until just before 1905.

THE GRADUATE ALUMNI, *Alfred Leon Foster *31*, Princeton Alumni Weekly (October 25, 1995), 55. Brief obituary of Alfred Leon Foster (1904–1994), a specialist in Boolean algebra, Boolean rings, and universal algebra who received his doctorate in mathematics at Princeton in 1931.

Ivor GRATTAN-GUINNESS, *Beyond categories: The lives and works of Charles Sanders Peirce*, Annals of Science **51** (1994), 531–538. Biographical sketch emphasizing Peirce's reputation and the Harvard University philosophy department's treatment of him.

Marcel GUILLAUME, *La logique mathématique en sa jeunesse*, in Jean-Paul Pier (editor), *Development of Mathematics 1900 – 1950* (Basel/Boston/Berlin, Birkhäuser, 1994), 185–367. An introduction into the developments in mathematical logic from 1900 to 1950 for nonspecialists.

Akihiro KANAMORI, *The mathematical development of set theory from Cantor to Cohen*, Bulletin of Symbolic Logic **2** (1996), 1–71. The author very ambitiously seeks to trace the entire development of set theory as an independent mathematical discipline, "from its beginnings through creation of forcing" from the perspective of the two contentions that it arose "intertwined with pronounced metaphysical attitudes" but developed, even in spite of the metaphysical claims made for it, "through a progression of *mathematical* moves." The treatment, despite its length, is spotty, selective, and far from complete as a history of the mathematical development of set theory.

Christel KETELSEN, *Die Gödelschen Unvollständigkeitssätze. Zur Geschichte ihrer Entstehung und Rezeption* (Stuttgart, Franz Steiner Verlag Weisbaden GmbH., 1994). Based on the author's Ph.D. thesis, this is a description of the scientific- intellectual background in which Gödel wrote his incompleteness results, and gives a description of the state of knowledge in mathematical logic in the 1920s and ending in mid-1930s with Turing's work on computable numbers. The author concentrates on Gödel's work and only the results of others that were of specific importance to Gödel's work. With regard to the influences of Gödel's work, the period after the mid-1930s is considered only with respect to the philosophical debate on mechanism in the 1960s-70s.

Norman MACRAE, *John von Neumann* (New York, Pantheon Books, 1992). A non-technical biography of von Neumann, focussing on political and personal aspects of his life and their influence on his creative scientific work. According to Norman (p. 6), von Neumann "wanted in the 1920s to become the supreme mathematical logician. . . ." The heart of the discussion of his youthful work on set theory is given at pages 92–96. We learn that the paper published in 1923 as "Zur Einführung der transfiniten Ordnungszählen" was written in 1921, when von Neumann was a seventeen-year old high school student. On pp. 95–96, Norman quotes a letter from Herbert Freaenkel to Stanislaw Ulam in which the former declares that when he read a copy of a manuscript titled "Die Axiomatisierung der Mengenlehre" which he received from Erhard Schmidt, he expressed the opinion that the work was "ex ungue leonem." The manuscript in question became von Neumann's doctoral thesis. Norman concludes (p. 97) that "[i]f these were Johnny's two lost years of 1921–23, they appeared to his early contemporaries," including Hilbert, "to be about as lost as the two years of the Great Plague in the 1660s when Newton had dragged himself away to rural Lincolnshire, where he more or less invented modern science." Von Neumann's views on history and foundations of mathematics are discussed at pp. 123–125 in the context of the so-called "frog and mouse battle" over Hilbert's program between Hilbert and Brouwer, in which MacRae (p. 123) accepts von Neumann's description of himself as "Hilbert's standard-bearer". This battle is seen to have ended with the publication of Gödel's incompleteness results. Nevertheless, von Neumann is considered (pp. 125–126) to have profited from his early work in set theory and foundations — according to MacRae (p. 143) in spite of his own feeling "that his prewar work on logic had run aground on Gödel" — since it was von Neumann's work, as the "last great axiomatizer" (p. 126) and his encoding of computer instructions as numbers which parallels Gödel's encodings of logical statements as numbers, that computers needed.

Ф. А. МЕДВЕДЕВ (F. A. MEDVEDEV), *Теорема Дюбуа-Реймона и порядковые трансфинитные числа в исследованиях Э. Бореля,* Историко-математические исследования **XXXV** (1994), 255-285. The Dubois-Reymond theorem and transfinite ordinals in the research of E. Borel.

N. M. NAGORNY, *Andrei Markov and mathematical constructivism*, in Dag Prawitz, Brian Skyrms & Dag Westerståhl (editors), *Logic, methodology and philosophy of science, IX (Uppsala, 1991)* (Amsterdam, North-Holland, 1994), 467–479. Sketches the work of Markov in constructivist logic, in particular on the theory of algorithms, and with special emphasis on the theory of constructive processes and how it relates to the work of the Dutch intuitionists.

Karen Hunger PARSHALL, *How we got where we are: An international over-*

view of mathematics in national contexts (1875–1900), Notices of the American Mathematical Society **43** (1996), 287–296. Examines the professionalization and specialization within mathematics during the last quarter of the nineteenth century, especially as concerns education at the university graduate level and the creation of national mathematics societies and the establishment of specialized mathematics journals. Photographs of a number of mathematicians are included (there is also a large photograph of E. H. Moore on the cover of this issue of the *Notices*). It is noted (p. 293) that the research work, teaching influence which stressed communication, and support for the founding of the Moscow Mathematical Society and its journal *Matematicheskii Sbornik* of Nikolai Vasil'evich Bugaev fostered a conception of and attitude towards mathematics that "proved conducive to the acceptance of Cantor's novel set-theoretic ideas" and to the foundation of the Moscow school of function theory led in the early decades of the twentieth century by Bugaev's student Egorov and Egorov's student N. N. Luzin.

Charles PARSONS, *In menoriam: Hao Wang, 1921 – 1995*, Bulletin of Symbolic Logic **2**(1996), 108–111. A brief appreciation and sketch of the life and work of Hao Wang.

W. V. QUINE, *The inception of* "New Foundations", Bulletin Soc. Math. Belg., Sér. B **45** (1993), 325–328. Reprinted in W. V. Quine, *Selected logic papers* (Cambridge, Mass., Harvard University Press, enlarged edition, 1995), 287–289. (See Jonathan Weingartner's review of the new edition of Quine's *Selected logic papers* in *Modern Logic* **6** (1996), 109–112, esp. p.111.)

Adrian RICE, Robin J. WILSON & J. Helen GARDNER, *From student club to national society: The founding of the London Mathematical Society in 1865*, Historia Mathematica **22** (1995), 402–421. The appendix on "Key Figures" includes a short sketch and photograph of Augustus De Morgan, pp. 415–416.

Abraham ROBINSON, *Non-standard Analysis* (Princeton, Princeton University Press, 1996). This is a new reprint of the revised 1974 edition of Robinson's pioneering text on nonstandard analysis, with a new foreword by Wilhelmus A. J. Luxemburg. In this book, Robinson explained the development and applications of the field which he developed.

Rudy RUCKER, *Infinity and the Mind* (Princeton, Princeton University Press, 1995). This is a Princeton Science Library paperback edition of the book originally published by Birkhäuser in 1982.

Stuart SHANKAR, *Turing and the origins of AI*, James J. Tattersall (editor), *Proceedings of the Canadian Society for the History and Philosophy of Mathematics 19th Annual Meeting (Ottawa, Carleton University, 1993)*, 1–41. Emphasizing Turing's approach to bringing together the mathematical and psychological aspects of application of mechanical rules and learning behavior, Turing's rôle in the 1940s in the development of artificial intelligence is examined.

Kazimierz ŚWIRYDOWICZ, *Logicne teorie obowwiązku warunkowego* (Poznań, Wydawnictwo Naukowe Uniwersytetu im. Adama Mickiewicza w Poznaniu, 1995). In this study of the logical theory of conditional duty, the author creates a new approach to the problem of the formalization of the concept of conditional duty and the problem of the formalization of normative reasoning by unifying the system of dyadic deontic logic of Georg Henrik von Wright of 1964-65, a system of dyadic deontic logic developed by Zladisław Ziemba, and the author's own system of the *logic of norms*.

Unsigned, *In memoriam: Robin Gandy*, Bulletin of Symbolic Logic **2** (1996), 121. Brief notice of the death of Robin Gandy.

Georg Henrik VON WRIGHT, *Logic and philosophy in the twentieth century*, in Dag Prawitz, Brian Skyrms & Dag Westerståhl (editors), *Logic, methodology and philosophy of science, IX (Uppsala, 1991)* (Amsterdam, North-Holland, 1994), 9–25.

Fernando ZALEMEA, *Hipótesis del continuo, definabilidad y functiones recursivas: Historia de un desencuento (1925 – 1955)*, Mathesis **10** (1994), 187–203. Definability and recursion as presented by Hilbert, Herbrand, and Gödel on the one hand, and the projective and analytic hierarchies as presented by the Polish school on the other hand, created difficulties for each other in their attempts to resolve the continuum hypothesis. This "disencounter" [*desencuento*] was repaired when ideas of Mostowski were applied by Kleene and Addison to explain the connections between recursion hierarchies and analytic sets and led to the creation of descriptive set theory.

Fernando ZALEMEA, *La filosofía de matemática de Albert Lautmann*, Mathesis **10** (1994), 273–289. Argues that Albert Lautmann's ideas on philosophy of mathematics came to fruition in developing the methods used in model theory and category theory.