HISTORIA MATHEMATICA **21** (1994), 225–240

ABSTRACTS

Edited by DAVID E. ZITARELLI

The purpose of this department is to give sufficient information about the subject matter of each publication to enable users to decide whether to read it. It is our intention to cover all books, articles, and other materials in the field.

Books for abstracting and eventual review should be sent to this department. Materials should be sent to Prof. David E. Zitarelli, Department of Mathematics, Temple University, Philadelphia PA 19122, U.S.A. (e-mail: V5319E @ TEMPLEVM.BITNET or V5319E @ VM.TEMPLE.EDU)

Readers are invited to send reprints, autoabstracts, corrections, additions, and notices of publications that have been overlooked. Be sure to include complete bibliographic information, as well as transliteration and translation for non-European languages. We need volunteers willing to cover one or more journals for this department.

Readers interested in receiving a computer-readable version of the abstracts, beginning with #11.3.1, are invited to write to the Abstracts Editor.

In order to facilitate reference and indexing, entries are given abstract numbers which appear at the end following the symbol #. A triple numbering system is used: the first number indicates the volume, the second the issue number, and the third the sequential number within that issue. For example, the abstracts for Volume 20, Number 1, are numbered: 20.1.1, 20.1.2, 20.1.3, etc.

For reviews and abstracts published in Volumes 1 through 13 there are an *author index* in Volume 13, Number 4, and a *subject index* in Volume 14, Number 1.

The initials in parentheses at the end of an entry indicate the abstractor. In this issue there are abstracts by Víctor Albis (Bogotá), Thomas L. Bartlow (Villanova, PA), Donald W. Bushaw (Pullman, WA), Stephan C. Carlson (Terre Haute, IN), Hung Dinh (St. Paul, MN), Mona Fabricant (Bayside, NY), Della Dumbaugh Fenster (Charlottesville), Peter L. Glidden (Champaign, IL), Ivor Grattan-Guinness (Middlesex), Louise S. Grinstein (Brooklyn), Roger W. Johnson (Northfield, MN), Herbert Kasube (Peoria, IL), Victor J. Katz (Washington), Maita Levine (Cincinnati), Ivica Martinović (Dubrovnik), Jeff Ondich (Northfield), Karen V. H. Parshall (Charlottesville), James V. Rauff (Decatur, IL), Matthew P. Richey, (Northfield, MN), Peter Ross (Santa Clara, CA), David N. Seppala-Holtzman (College Point, NY), Frank Swetz (Middletown, PA), Theodore A. Vessey (Northfield), Patti Lynn Wilger (Charlottesville), and David E. Zitarelli.

AENISHÄNSLIN, MARKUS. *Le Tractatus de Wittgenstein et l'Ethique de Spinoza: Etude de comparison structurale*, Basel: Birkhäuser Verlag AG, 1993, 432 pp., hardcover, DM 98/öS 764.40/sFR. 88/£ 38. This work, which is based on the author's 1988 doctoral dissertation at the Université de Provence, is divided into three parts. The first dissects the work of Wittgenstein. The second analyzes Spinoza's doctrine. The third presents a comparative study of their constructions, using geometric models to interpret them, and allows one to determine the degree to which the 20th-century *Tractatus* is bound to the rationalism of the 17th-century *Ethics*. (DEZ) #21.2.1

AKVIS, M. A., AND ROSENFELD, B. *Elie Cartan (1869–1951)*, trans. V. V. Goldberg, Providence, RI: American Mathematical Society, 1993. A biography of Elie Cartan, one of the greatest mathematicians of the 20th century, covering his work in differential geometry from Lie algebra and pseudogroups to differential systems and topology. See the review by S. S. Chern in the *Bulletin of the American*

0315-0860/94 $6.00

Mathematical Society **30** (1994), 95–96, for a brief discussion of Cartan's major ideas and results. (DEZ) #21.2.2

AL-HAYTHAM, IBN. *See* #21.2.108.

ALBERS, DONALD J. Freeman Dyson: Mathematician, Physicist, and Writer, *The College Mathematics Journal* **25** (1994), 3–21. An interview with Freeman Dyson, the British-born physicist, who discusses his education at Cambridge, reflects on life at the Institute for Advanced Study, and describes the key differences between mathematicians and physicists. (DEZ) #21.2.3

ALBERS, DONALD J., AND ALEXANDERSON, GERALD L. A Conversation with Richard K. Guy. *The College Mathematics Journal* **24** (1993), 122–148. The conversation with the self-proclaimed amateur mathematician Richard K. Guy ranges over his family, schooling, teaching positions, and collaborators. Guy is best known for his work in graph theory, number theory, and unsolved problems. (DEZ) #21.2.4

ALEXANDERSON, GERALD L. *See* #21.2.4.

ANSHEL, IRIS LEE AND ANSHEL, MICHAEL. From the Post–Markov Theorem through Decision Problems to Public-Key Cryptography, *The American Mathematical Monthly* **100** (1993). 835–844. A survey of the work of Emil Post (1897–1954) on algorithmic decision problems. It concludes with a question of Post's influence on his contemporaries. (DEZ) #21.2.5

ANSHEL, MICHAEL. *See* #21.2.5.

ARENZANA HERNÁNDEZ, VÍCTOR. Algunos aspectos de los saberes matemáticos en Aragón en el siglo XVIII [Some Aspects of Mathematical Knowledge in Aragón in the 18th Century], in *Ciencia, Técnica y Estado en la España ilustrada,* eds. Joaquín Fernández Pérez and Ignacio González Tascón, Madrid: Ministerio de Educación y Ciencia, 1990, pp. 279–301. Teachers and textbooks at the University of Zaragoza and the Economic Society of Friends of the Country in the 18th century, including Villalpano, Ventura de Ävila, Conde, and Rancaño de Cancio. (VA) #21.2.6

AVITAL, S., AND KLEINER, I. Themes in the Evolution of Number Systems, *International Journal of Mathematical Education in Science and Technology* **23** (1992), 445–461. Five of the eight themes discussed are "Beyond the complex numbers," "The algebraic–transcendental dichotomy," "Transfinite numbers," "Numbers and geometry," and "Numbers and analysis." The historical origin of many of the mathematical ideas involved is sketched. An extensive bibliography of 106 references is included. *See also* #19.3.59. (PR) #21.2.7

BALIBAR, F. Geometrie und Erfahrung. Pp. 91–97 in #21.2.14. The author discusses Faraday's lines of force. He argues that Faraday's work represented a geometrization of physics at a time when physical questions were dealt with mathematically rather than spatially. (PLW) #21.2.8

BECHLER, ZEV. *Newton's Physics and the Conceptual Structure of the Scientific Revolution*, Norwell, MA: Kluwer Academic, 1991, xviii + 588 pp., $189. Realizing that the story of Aristotle's law of free fall is a myth leads the author to assert Newtonian physics (and its historiography) has both Aristotelian (rational) and Platonic (irrational) aspects. This thesis is argued for using an extensive, though selective, sequence of historical examples. [Adapted with permission from *The American Mathematical Monthly* **100** (1993), 418.] (MPR) #21.2.9

BERNAL, MARTIN. Animadversions on the Origins of Western Science, *Isis* **83,** (1992), 596–607. In an article sure to be as controversial as his book *Black Athena,* the author marshals arguments for believing that Greek geometry owes much of its strength to Egyptian geometry. His contention that the view that Egyptian mathematics lacks sophistication stems from the general assumption that "no Africans of any sort could have been capable of such great intellectual achievements" needs to be confronted by all who seek a truthful view of the origins of mathematics. (VJK) #21.2.10

BIAGIOLI, MARIO. *Galileo, Courtier,* Chicago: Univ. of Chicago Press, 1993, 414 pp., hardbound, $29.95/£23.95. The author offers a reinterpretation of Galileo's career during the period from 1610, when he became philosopher and mathematician to the Medici, to 1633, when he was tried and his theories condemned. Biagioli argues that one cannot distinguish between Galileo's roles as a scientist and as a courtier, that Galileo's courtly role was integral to the questions he examined, his methods, and his conclusions. From the jacket: "*Galileo, Courtier* is neither a biography nor a conventional history of science. It is, rather, a fascinating cultural and social history highlighting the workings of power, patronage, and credibility in the development of science." (DEZ) #21.2.11

BOGOLIUBOV, ALEKSEI. Problemas generales en la historia social de la ciencia [General Problems in Social History of Science], *LLULL* **15** (1992), 467–469. (VA) #21.2.12

BOI, LUCIANO. L'espace: Concept abstrait et/ou physique; La géométrie entre formalisation mathématique et étude de la nature. Pp. 65–90 in #21.2.14. Examines the "problem of space" and its connection to geometry and physics in the work of late 19th- and early 20th-century mathematicians. The author argues that, in a certain sense, the form, or the geometry, of space cannot be separated from its material substance. (PLW) #21.2.13

BOI, LUCIANO, FLAMANT, DOMINIQUE, AND SALANSKIS, JEAN-MICHEL (eds.) *1830–1930: A Century of Geometry. Epistemology, History and Mathematics,* Berlin: Springer-Verlag, 1992, 304 pp., hardbound, $55. A selection of 24 articles based on lectures presented at the 1989 conference "1830–1930: Un Siècle de Géométrie: de C. F. Gauss et B. Riemann à H. Poincaré et E. Cartan; épistémologie, histoire et mathématiques" held at the Institut Henri Poincaré in Paris. In keeping with the goals of the conference, the essays in this book "re-examine the recent history of geometry in light of the contemporary developments of mathematics and physics." The articles are grouped into the five categories of "Pluralization of geometry: New foundations and continuity of problems," "Historical and epistemological aspects of the connexion between physics and geometry," "Formalism and intuition," "The philosophical problem of space," and "Some insights about modern physics." Papers by Ch. Houzel, E. Scholz, J. J. Gray, D. E. Rowe, B. Teissier, L. Boi, F. Balibar, R. Farwell and Ch. Knee, G. Israel, M. Paty, J.-P. Bourguignon, H. Sinaceur, L. Geymonat, G. G. Granger, R. Thom, K. Volkert, H. Freudenthal, D. Flamant, G. Chatelet, G. Heinzmann, J.-M. Salanskis, G. Cohen-Tannoudji, T. Regge, and J. Petitot are abstracted separately. (DDF) #21.2.14

BOURGUIGNON, JEAN-PIERRE. Transport parallèle et connexions en géométrie et en physique. Pp. 150–164 in #21.2.14. The author traces the development of the notion of connection in geometry and physics from 1830 to 1970. He discusses the repeated disappearance and reappearance of the concept over time, arguing that scientific ideas do not necessarily develop in a steady, continuous manner. (PLW) #21.2.15

BRANN, EVA. *See* #21.2.64.

BRESSOUD, DAVID. *See* #21.2.67.

CANNELL, D. M., AND LORD, N. J. George Green, Mathematician and Physicist 1793–1841. *The Mathematical Gazette* **66** (1993), 26–51. A short personal and professional biography of George Green. Includes a discussion of how Green came to mathematics and how his work achieved recognition belatedly. It is argued that Green's work was much in advance of his time. The historical discussion is followed by a discussion of Green's *An Essay on the Application of Mathematical Analysis to the Theories of Electricity and Magnetism* and summaries of his papers on fluids, ellipsoids, pendulums, water waves, sound, and light. A map of Green's Mill in Nottingham is included as a note. (JVR) #21.2.16

CHATELET, GILLES. La capture de l'extension comme dialectique géométrique: Dimension et puissance selon l'*Ausdehnung* de Grassmann (1844). Pp. 222–244 in #21.2.14. The author discusses Hermann Grassmann's *Die lineale Ausdehnungslehre* in the context of the philosophy of nature of Hegel and Schelling. (PLW) #21.2.17

COHEN-TANNOUDJI, GILLES. Geometrical Concepts in Quantum Physics. Pp. 267–269 in #21.2.14. Discusses the "Quantum horizon," the "Real–potential–actual triad," and the "Geometry of matter–space–time." (DDF) #21.2.18

CONTE, ALBERTO. *See* #21.2.118.

CORRY, LEO. Kuhnian Issues, Scientific Revolutions and the History of Mathematics, *Studies in History and Philosophy of Science* **24** (1993), 95–117. Suggests a model for reassessing the many interpretations of Kuhn's theory. Applies particular versions of Kuhn to the history of mathematics. The author seeks a definition of revolution which fits the Kuhnian model as closely as possible, allows for revolutions in mathematics, and leads to new historical insights. (DDF) #21.2.19

COUCHOUD, SYLVIA. *Mathématiques égyptiennes: Recherches sur les connaisances mathématiques de l'Égypte pharaonique,* Paris: Éditions Le Léopard d'Or, 1993, 208 pp. 150 FF., softcover. This book provides a detailed discussion of Egyptian mathematics. It opens with a general presentation of the characteristics of Egyptian mathematics and proceeds to an analysis of Egyptian geometry as well as the Egyptian equivalents of algebraic equations and series. It also looks at specific problems and their solutions from Egyptian texts. (KVHP) #21.2.20

COX, DAVID A. Introduction to Fermat's Last Theorem, *The American Mathematical Monthly* **100** (1994), 3–14. Highlights from the history of Fermat's Last Theorem divided into three periods: Diophantus to Euler (250–1783), Euler to Frey (1783–1982), and Frey to Wiles (1982–1993.) An appended note written December 1993 affirms the author's belief in Wiles' proof. (DEZ) #21.2.21

CREMONA, LUIGI. *La corrispondenza de Luigi Cremona (1830–1903),* Vol. I, ed. Ana Millán Gasca. Serie de Quaderni della Rivista di Storia della Scienza, No. 1, Rome: Universitá degli Studi di Roma "La Sapienza," 1992, 183 pp. (VA) #21.2.22

CZICHOWSKI, GÜNTER. *See* #21.2.73.

DADIĆ, ŽARKO. 1992. *The History of Ideas and Methods in Mathematics and Physics* [in Croatian.] Zagreb: Školska Knjiga, 1992, 206 pp., hardbound. An account of mathematical and physical ideas and methods from prehistory to Einstein and Poincaré, with the basic thesis that discussion about fundamental concepts, e.g., force, continuity, infinity, and space, was the most influential factor in the development of mathematics and physics. The main authors whose contributions to the exact sciences are analyzed are Plato, Aristotle, Euclid, Ptolemy, Copernicus, Viète, Galileo, Bruno, Kepler, Descartes, Cavalieri, Newton, Leibniz, Johann Bernoulli, Euler, D'Alembert, Lagrange, Laplace, Cauchy, Maxwell, Dedekind, and Hilbert. Also includes contributions from prominent Croatian mathematicians and natural philosophers: Herman Dalmatin (Hermannus Dalmata, the first half of the 12th century), Federik Grisogono (1472–1538), Frane Petrić (1529–1596), Marin Getaldić (1568–1626), Stjepan Gradić (1613–1683), and Rugjer Bošković (1711–1787). (IM) #21.2.23

DAMEROW, PETER. *See* #21.2.86.

DAVIS, MICHAEL. Of Babbage and Kings: A Study of a Plagiarism Complaint, *Accountability in Research* **2** (1993), 273–286. The history of a charge of plagiarism in the history of computers. The case concerns the roles of Herman Berg and Alfred W. Sinderen in the discovery of a letter from Babbage to Quetelet. (DEZ) #21.2.24

DAVIS, PHILIP J. *Spirals from Theodorus to Chaos,* Wellesley, MA: A. K. Peters, Ltd., 1993, ix + 237 pp., hardcover. The text includes the three Hedrick Lectures on the history and mathematics of spirals given on the occasion of the 75th anniversary of the Mathematical Association of America. It also includes two supplements, one by Walter Gautschi on "The Spiral of Theodorus, Special Functions, and Numerical Analysis" and one by Arieh Iserles on "The Dynamics of the Theodorus Spiral." It ends with primary source excerpts which trace the history of spirals from Plato and Archimedes through Torricelli and Jean Bernoulli and on to Sylvester and Poincaré. (KVHP) #21.2.25

DE LORENZO, JAVIER. Dónde situar la matemática [Where to Frame Mathematics], *Mathesis (México)* **8** (1992), 369–387. The author proposes to frame conceptual mathematics as one of the consecutive processes of man as *homo modelator*. (VA) #21.2.26

DHOMBRES, JEAN. ¿Una historia de las ciencias o historias de las ciencias? Algunas reflexiones sobre trabajos franceses [A History of Science or Histories of Sciences? Some Reflections on French Works], *LLULL* **15**(29) (1992), 443–458. (VA) #21.2.27

DUMITRESCU, CONSTANTIN. A Brief History of the "Smarandache Function," *Smarandache Function Journal* **2–3** (1993), 3–9. A reprint of the paper abstracted in #21.1.42. (DEZ) #21.2.28

DUMITRESCU, CONSTANTIN. The Smarandache Function, *Mathematical Spectrum* **26** (1993), 39–40. Contains some of the historical elements of #21.2.28. (DEZ) #21.2.29

EDGERTON, DAVID. La enseñanza de la historia de la ciencia y la técnica en las universidades del Reino Unido [The Teaching of the History of Science and Technology at British Universities], *LLULL* **15** (1992), 470–473. (VA) #21.2.30

ENGEL, FRIEDRICH. *See* #21.2.73.

ENGLUND, ROBERT K. *See* #21.2.86.

ESTEBAN PIÑEIRO, MARIANO, AND JALÓN CALVO, MAURICIO. Una academia de matemáticas en el Valladolid ilustrado [An Academy of Mathematics in Enlightened Valladolid], in *Ciencia, Técnica y Estado en la España ilustrada*, eds. Joaquín Fernández Pérez and Ignacio González Tascón, Madrid: Ministerio de Educación y Ciencia, 1990, pp. 303–319. Some aspects of the history of mathematics in Spain in the 18th century. (VA) #21.2.31

ESTRIN, GERALD. The WEIZAC Years, *Annals of the History of Computing* **13** (1991), 317–339. A first-hand account of the early computer development in Israel triggered by Chaim Leib Pekeris. The WEIZAC project created the technical know-how necessary for Israel to play a strong role in the information revolution. (LSG) #21.2.32

FARWELL, RUTH, AND KNEE, CHRISTOPHER. The Geometric Challenge of Riemann and Clifford. Pp. 98–106 in #21.2.14. The article examines Bernhard Riemann's metric geometry, its subsequent translation and popularization by W. K. Clifford, and its ultimate acceptance in the context of Einstein's theory of general relativity. The authors argue that the idea's original framework was too difficult mathematically to be accepted at the time and that it was not accepted until a "safer" framework had been established by Einstein's work. (PLW) #21.2.33

FEFERMAN, ANITA BURDMAN. *Politics, Logic, and Love: The Life of Jean van Heijenoort*, Boston, MA: Jones & Bartlett, 1993, xv + 415 pp. $29.95. A biography of the prominent historian of logic Jean van Heijenoort. The introduction includes the fetching statement: "He was the quintessential romantic Frenchman, a nomad who made his rounds between France, Mexico, and the United States, who loved women and forgot about logic and reason, as time after time he found himself involved in affairs and marriages which caused pain, remorse, and eventually led to his own violent end." (DEZ) #21.2.34

FEINGOLD, MORDECHAI. Newton, Leibniz, and Barrow Too: An Attempt at Reinterpretation, *Isis* **84** (1993), 310–338. The author does not claim that Barrow should be considered the true inventor of calculus but calls instead for a reevaluation of his relationships with Newton and Leibniz. (DEZ) #21.2.35

FERRIER, RICHARD. *See* #21.2.80.

FLAMANT, DOMINIQUE. *See* #21.2.14.

FLAMANT, DOMINIQUE. La "lineale Ausdehnungslehre" (1844) de Hermann Günther Grassmann. Pp. 205–221 in #21.2.14. Situates Grassmann's *Die lineale Ausdehnungslehre* in the context of the work of some of his contemporaries and examines the introduction to his work and his general theory of forms. (PLW) #21.2.36

FRANKSEN, OLE EMMANUEL. Babbage and Cryptography. Or, the Mystery of Admiral Beaufort's Cipher, *Mathematics and Computers in Simulation* **35,** 327–367. A survey of Charles Babbage's interest in cryptography, drawing on various unpublished sources. Babbage anticipated several later developments, including properties of symmetry and of periodicity of coding procedures. (IGG) #21.2.37

FREUDENTHAL, HANS. What is Space? Pp. 202–204 in #21.2.14. Suggests that the prevailing view of space has its origins in mysticism. Discusses the ideas of Leibniz and Kant on this issue. (DDF) #21.2.38

FRITZCHE, BERND. *See* #21.2.73.

GANITANAND. Book Review, *Gaṇita-Bhāratī. Bulletin of the Indian Society for History of Mathematics* **14** (1992), 87–89. A review of Charles Wilson McArthur, *Operations Analysis in the United States Air Force in World War II,* Providence, RI: American Mathematical Society and London Mathematical Society, 1990. (HK) #21.2.39

GARDNER, J. HELEN, AND WILSON, ROBIN J. Thomas Archer Hirst—Mathematician Xtravagant. V. London in the 1860s, *The American Mathematical Monthly* **100** (1993), 827–834. English mathematician Thomas A. Hirst returns to London in the 1860s and interacts with the leading mathematicians there. The pinnacle of his career includes a university position and election to the Royal Society. (DEZ) #21.2.40

GARDNER, J. HELEN, AND WILSON, ROBIN J. Thomas Archer Hirst—Mathematician Xtravagant. VI. Years of Decline, *The American Mathematical Monthly* **100** (1993), 907–915. The sixth, and final, installment in a series or articles based on the diary of Thomas A. Hirst. This part chronicles his last two careers, notes his honors, and describes his last years from 1865 to 1892. (DEZ) #21.2.41

GEYMONAT, LUDOVICO. Le principe de dualité: Sa signification historique et épistémologique. Pp. 175–177 in #21.2.14. The author briefly outlines the history of the principle of duality from Gergonne and Poncelet, through the ideas of Möbius, Plücker, Christian von Staudt, Federigo Enriques, Gino Fano, and Oswald Veblen. He discusses the law's transformation from a philosophical idea in the work of Gergonne to its modern conception as a logical consequence of formal axioms. (PLW) #21.2.42

GIUSTI, ENRICO. *Euclides reformatus: La teoria delle proporzioni nella scuola galilieiana,* Torino: Bollati Boringhieri, 1993, 348 pp., 70,000 L., softcover. This book traces the history of the theory of proportion in Italy from the 14th century through the work of Galileo, Torricelli, and Borelli and to the end of the 17th century. It also reproduces two Latin texts by Guidobaldo dal Monte, one Italian text by Galileo, and a Latin work by Torricelli. (KVHP) #21.2.43

GOLDBERG, V. V. *See* #21.2.2.

GOODSTEIN, JUDITH R. *See* #21.2.118.

GRABINER, JUDITH V. Book Review, *The American Mathematical Monthly* **100** (1993), 304–308. A review of *Ethnomathematics: A Multicultural View of Mathematical Ideas* by Marcia Ascher. (*See* #19.1.2.) The reviewer commends the book for presenting the mathematics of various cultures. However, the reviewer distinguishes between ethnomathematics and the history of mathematics, and suggests a different way of applying multiculturalism to the history of mathematics. (DEZ) #21.2.44

GRANGER, GILLES GASTON. The Formal and the Transcendental in Mathematics. Pp. 178–183 in #21.2.14. Considers the question "What is the nature and scope of the objectivity of mathematics?"

Toward this end, the author begins with a consideration of the original Kantian dichotomy between the terms "logical" and "transcendental," and concludes with an examination of mathematical objects. (DDF) #21.2.45

GRATTAN-GUINNESS, IVOR. A Residual Category: Some Reflections on the History of Mathematics and Its Status, *The Mathematical Intelligencer* **15**(4) (1993), 4–6. An opinion piece lamenting the status of historians of mathematics within the mathematical community, misunderstandings of the discipline of history of mathematics, and lack of appreciation of history by many mathematicians. (TLB) #21.2.46

GRATTAN-GUINNESS, IVOR. Obituary: Cecily Tanner 1900–1992, *Association for Women in Mathematics Newsletter* **23** (1993), 10–15. Summary of the life and work of Cecily Tanner, a daughter of William Henry and Grace Chisholm Young. A reprint of the article abstracted in #20.4.56. (LSG) #21.2.47

GRATTAN-GUINNESS, IVOR. *See also* #21.2.118.

GRAVER, JACK, SERVATIUS, BRIGITTE, AND SERVATIUS, HERMAN. *Combinatorial Rigidity*, Providence, MA: American Mathematical Society, 1993, 172 pp., hardcover, $41. A textbook in which combinatorial rigidity is presented in a historical context. (DEZ) #21.2.48

GRAY, J. J. Poincaré and Klein—Groups and Geometries. Pp. 35–44 in #21.2.14. Discusses the introduction of group-theoretic ideas into geometry. Describes the development of Poincaré's ideas in non-Euclidean geometry. The author argues that non-Euclidean geometry played a significant role in establishing the importance of group-theoretic ideas in any kind of geometry. (DDF) #21.2.49

GUPTA, R. C. The Mahārīva–Fibonacci Device to Reduce p/q to Unit Fractions. *ISGHPM Newsletter* (1993). (VA) #21.2.50

GUPTA, S. DAS. Book Review, *Gaṇita-Bhāratī. Bulletin of the Indian Society for History of Mathematics* **14** (1992), 93–96. A review of Nandalal Maiti, *A Brief History of Greek Mathematics*, Calcutta: Firma KLM, 1987. (HK) #21.2.51

HALMOS, PAUL. Postcards from Max, *The American Mathematical Monthly* **100** (1993), 942–944. Comments on Max Zorn and his habit of sending "short and mysterious friendly postcard[s]." (DEZ) #21.2.52

HANSEN, VAGN LANDSGAARD. Jakob Nielson (1890–1959), *The Mathematical Intelligencer* **15**(4) (1993), 44–53. A summary of the life and work of the Danish mathematician Jakob Nielsen. (TLB) #21.2.53

HEINZMANN, GERHARD. Helmholtz and Poincaré's Considerations on the Genesis of Geometry. Pp. 245–249 in #21.2.14. Suggests Helmholtz as one of the historical sources for Poincaré's distinction between arithmetical and geometrical judgments. Considers the ideas of Helmholtz on freely movable rigid bodies in the context of his theory of sensual knowledge. (DDF) #21.2.54

HERNÁNDEZ, JESÚS. El rigor de Cauchy y el análisis matemático [Cauchy's Rigor and Mathematical Analysis], *Mathesis (México)* **9** (1993), 225–240. A sketch of the role played by mathematical rigor in the work of Cauchy in mathematical analysis. (VA) #21.2.55

HERSH, REUBEN. *See* #21.2.75.

HERZ-FISCHLER, ROGER. A "Very Pleasant Theorem," *The College Mathematics Journal* **24** (1993), 318–324. The author lists various rediscoverers of a Kepler triangle, one whose sides are in extreme and mean measure, from Kepler's own discovery in 1597 through one in 1990 whose wording evokes Kepler's "very pleasant theorem." (DEZ) #21.2.56

HORMIGÓN, MARIANO. Las matemáticas en la ilustración española. Su desarrollo en el reinado de Carlos III [Mathematics in the Spanish Enlightenment. Its Development under Charles the Third], in

Ciencia, Técnica y Estado en la España ilustrada, eds. Joaquín Fernández Pérez and Ignacio González Tascón, Madrid: Ministerio de Educación y Ciencia, 1990, pp. 265–278. Spanish textbook authors and the reception and diffusion of calculus in the 18th century. (VA) #21.2.57

HOUZEL, CHRISTIAN. The Birth of Non-Euclidean Geometry. Pp. 3–21 in #21.2.14. Considers the discovery and initial developments of non-Euclidean geometry, beginning with Gauss' early works in the subject and ending with Riemann's memoir of 1854. Discusses the contributions of C. F. Gauss, Franz Taurinus, Janos Bolyai, and Nikolai Lobachevsky, among others. Includes a brief look at the independent development of differential geometry during the same time period. (DDF) #21.2.58

HUGHES, BARNABAS, Diametralle Nombres [in English], *The Mathematics Teacher* **86** (1993), 296 and 320. A letter discussing diametral numbers in Robert Recorde's *The Whetstone of Whit.* (DEZ) #21.2.59

INEICHEN, ROBERT. Aus der Vorgeschichte der Mathematischen Statistik, *Elemente der Mathematik* **47** (1992), 93–107. A discussion of the prehistory of mathematical statistics as exemplified by elements in the writing of Cicero, Gregory of Tours, Cardano, Kepler, De Moivre, and John Arbuthnot. (DWB) #21.2.60

ISRAEL, GIORGIO. La historia de la ciencia y su enseñanza en la Italia de hoy [The History of Science and Its Teaching in Contemporary Italy], *LLULL* **25**(29) (1992), 458–467. (VA) #21.2.61

ISRAEL, GIORGIO. Poincaré et Enriques: Deux points de vue différents sur les relations entre géométrie, mécanique et physique. Pp. 107–126 in #21.2.14. A discussion of the different points of view of Henri Poincaré and Federigo Enriques concerning the relationships between physics and mathematics. The author argues that these points of view provide a case study of the Kuhnian "essential tension" between tradition and innovation. He categorizes his work as a contribution to the history of qualitative analysis. (PLW) #21.2.62

JALÓN-CALVO, MAURICIO. *See* #21.2.31.

KEATING, JEROME P., MASON, ROBERT L., AND SEN, PRANAB K. *Pitman's Measure of Closeness: A Comparison of Statistical Estimators,* Philadelphia: Society for Industrial and Applied Mathematics, 1993, xx + 226 pp., softbound, $26.50. Presents a nice history of Pitman's measure of closeness (PMC) in statistics. [Adapted with permission from *The American Mathematical Monthly* **101** (1994), 97.] (RWJ) #21.2.63

KLEIN, JACOB. *Greek Mathematical Thought and the Origin of Algebra,* trans. Eva Brann, New York: Dover, 1992, xv + 360 pp., paperbound, $9.95. Republication of the 1968 MIT Press book. (DEZ) #21.2.64

KLEINER, ISRAEL. Book Review, *The Mathematics Teacher* **85** (1992), 490. A review of the reissue of *Historical Topics for the Mathematics Classroom* by the National Council Teachers of Mathematics (second ed. 1989, xvi + 542 pp., paperbound, $28) that calls for an updating instead of a mere reissue. (DEZ) #21.2.65

KLEINER, ISRAEL, AND SHENITZER, A. Mathematical Building Blocks, *Mathematics Magazine* **66** (1993), 3–13. A collection of examples from different areas of mathematics that are accompanied by remarks of a historical nature. The "building blocks" run the gamut from prime numbers to wavelets. (DEZ) #21.2.66

KLEINER, ISRAEL. *See also* #21.2.7.

KNEE, CHRISTOPHER. *See* #21.2.33.

KNOPP, MARVIN, AND SHEINGORN, MARK. (eds.), *A Tribute to Emil Grosswald: Number Theory and Related Analysis,* Contemporary Mathematics, Vol. 143, Providence, RI: American Mathematical

Society, 1993, viii + 612 pp., paperbound, $79. The bulk of this volume contains papers by leading contemporary researchers in number theory, modular forms, combinatorics, and related analysis in honor of Temple University mathematician Emil Grosswald. The first part contains "In Appreciation of Emil Grosswald," by David Bressoud and the editors, in which Bressoud discusses Grosswald as a dissertation advisor, Sheingorn describes Grosswald's devotion to mathematics, and Knopp relates Grosswald's "life," as opposed to mere "career," as a mathematician. There are also lists of Grosswald's students and publications. (DEZ) #21.2.67

KOBLITZ, ANN HIBNER. A Convergence of Lives: Sofia Kovalevskaia: Scientist, Writer, Revolutionary, New Brunswick, NJ: Rutgers Univ. Press, 1993. A biography of Sofia Kovalevskaia that discusses the significance of her contributions to mathematics but emphasizes her life rather than her mathematical achievements. Included is an extensive description of the nihilist movement of the Russian intelligentsia in the 1860s and a detailed account of the women's movement in Russia in the latter part of the 19th century. This new edition contains a lengthy new preface and some changes from the 1983 original version published by Birkhäuser (ML) #21.2.68

KUSHNER, BORIS A. Russians Overlooked in History of Mathematics Texts, *Notices of the American Mathematical Society* **40** (1993), 1331–1332. Letter to the editor complaining about the paucity of coverage of Russian contributions in English-language textbooks. One author of such a book, David Burton, responds. (DEZ) #21.2.69

LARSEN, PAUL. *See* #21.2.86.

LAUBENBACHER, REINHARD C., AND PENGELLEY, DAVID J. Eisenstein's Misunderstood Geometric Proof of the Quadratic Reciprocity Theorem, *The College Mathematics Journal* **25** (1994), 29–34. An explication of Gottfried Eisenstein's geometric proof of the law of quadratic reciprocity, comparing it with Gauss' famous third proof. (DEZ) #21.2.70

LAUBENBACHER, REINHARD C., AND PENGELLEY, DAVID J. Great Theorems: The Art of Mathematics; A Course Based on Original Sources, *Newsletter of the International Study Group on the Relations Between History and Pedagogy of Mathematics* **28** (March 1993), 7–10. Description of an upper-level honors course at New Mexico State University, based on reading works of the masters, which encompasses several mathematical themes to provide an overall view of mathematics. *See* #21.2.87. (VJK) #21.2.71

LESMES CAMACHO, JAIME. La obra matemática de Guillermo Restrepo [The Mathematical Work of Guillermo Restrepo], *Lecturas Matemáticas* **13** (1992), 11–24. The author reviews the work of the Colombian mathematician Guillermo Restrepo, covering important and pioneering results in the differentiability of norms and seminorms on Banach spaces and approximation theory in Banach spaces. *See also* #21.2.100 and #21.2.110. (VA) #21.2.72

LIE, SOPHUS, STUDY, EDUARD, AND ENGEL, FRIEDRICH. *Beiträge zur Theorie der Differentialinvarianten,* eds. Günter Czichowski and Bernd Fritzche, Teubner Archiv zur Mathematik, Vol. 17, Stuttgart/Leipzig: B. G. Teubner Verlagsgesellschaft, 1993, 226 pp, softcover. A reproduction of three papers by Sophus Lie, one by Eduard Study, and three by Friedrich Engel on differential invariant theory. The volume also includes mathematical commentary and a biographical essay. (KVHP) #21.2.73

LLOMBART PALET, JOSÉ. Las matemáticas y otras ciencias en el País Vasco durante la Ilustración. El Fondo Prestamero [Mathematics and Other Sciences in the Basque Country During the Enlightenment], in *Ciencia, Técnica y Estado en la España ilustrada,* eds. Joaquín Fernández Pérez and Ignacio González Tascón, Madrid: Ministerio de Educación y Ciencia, 1990, pp. 321–331. Institutions, teachers (including J. V. Ibañez, I. de Albiz, G. Mas, and A. R. Azcárate), and textbooks in the history of mathematics in Spain in the 18th century. (VA) #21.2.74

LORCH, EDGAR R. Szeged in 1934, *The American Mathematical Monthly* **100** (1993), 219–230. This account, edited posthumously by Reuben Hersh, describes Lorch's predicament in 1933 that impelled

him to study functional analysis with Frederick Riesz the following year in Hungary. "Riesz was indeed a perfect teacher and a warm companion." Lipót Fejér also influenced Lorch. (DEZ) #21.2.75

LORD, N. J. *See* #21.2.16.

MARACCHIA, SILVIO. *Dalla geometria euclidea alla geometria iperbolica: Il modello di Klein,* Naples: Liguori Editore, 1993, 186 pp., 25,000 L., softcover. Following a brief historical discussion, this book presents a mathematical discussion of (1) Felix Klein's geometrical model, (2) hyperbolic geometry in Klein's model, and (3) the relationship between Euclidean and non-Euclidean geometry and projective geometry. (KVHP) #21.2.76

MARTÍNEZ, RAFAEL J., AND RUIZ, CONCEPCIÓN. Matematicas y luz: Un encuentro en el Medievo [Mathematics and Light: An Encounter in the Middle Ages], *LLULL* **15** (1992), 353–368. The authors maintain that a change of emphasis from the study of words to that of things occurred in the 12th century and examine the role played by mathematics in this process, in particular by geometry in the study of the behavior of light. (VA) #21.2.77

MARTINOVIĆ, IVICA. Bošković's Unrealized Theory of Infinitesimals: Between Framework of the Theory and Application of the Method [in Croatian.] *Filozofska Istrazivanja* **49** (1993), 453–474. A discussion of the evolution of the theory of infinitesimals with Rugjer Bošković, who solved his fundamental methodological dilemma by asserting that the infinitesimal method was more appropriate for solving more complex and more general problems than the geometric method of Euclid. (DEZ) #21.2.78

MAXWELL, JOHN D. John Marvin Colaw and *The American Mathematical Monthly, The American Mathematical Monthly* **100** (1993), 117–118. Biographical comments on John Marvin Colaw (1860–1939), one of the most prominent mathematicians in Virginia during his lifetime. (DEZ) #21.2.79

MCDOWELL, GEORGE L., AND SOKOLIK, MERLE A. *The Data of Euclid, Translated from the Text of Menge,* Baltimore: Union Square Press, 1993, xxi + 207 pp., $40.00, hardcover. A translation into English of the Greek text compiled and published by Henricus Menge in 1896, this book contains an introduction by Richard Ferrier. (KVHP) #21.2.80

MONAGHAN, PETER. The Strange Saga of the Biography of a Brilliant Man, *The Chronicle of Higher Education* **39** (March 3, 1993), A6–A7, A14. Indiana University Press has published *Charles Sanders Peirce: A Life* by Joseph Brent, after a 30-year hiatus during which the author was unable to obtain permission from Harvard University, the owner of most of Peirce's papers, to publish a book version of Brent's Ph.D. dissertation on Peirce. The reasons for the refusal were apparently related to certain aspects of Peirce's personal life that members of the Harvard philosophy department did not want bruited about. This article is accompanied by "Plunging Into the Jumbled Papers of a Multifaceted, Troubled Genius," also by Manoghan, concerning the vicissitudes of the Peirce papers. (DWB) #21.2.81

MONTALCINI, RITA LEVI. *See* #21.2.118.

MORENO, LUIS ENRIQUE. Cálculo: Una perspectiva histórica [Calculus: A Historical Approach], *Enseñanza Universitaria (Nueva Serie)* **3** (1992), 71–78. The pedagogy of calculus from a historical perspective. (VA) #21.2.82

MOSQUERA VELASCO, JAMES. La matemática de los motilones o baríes [The Mathematics of the Motilones or Baríes], *Lecturas Matemáticas* **13** (1992), 105–110. The author examines some aspects of the mathematical culture of the Motilón or Barí indians, who live in Colombia and Venezuela. Most of the paper is dedicated to their numeral system. (VA) #21.2.83

MUKHERJEE, R. N. Book Review, *Gaṇita-Bhāratī. Bulletin of the Indian Society for History of Mathematics* **14** (1992), 89–91. A review of M. D. Pandit, *Zero in Panini*, Pune: Univ. of Ponna, 1990. (HK) #21.2.84

NEEDHAM, TRISTAN. Newton and the Transmutation of Force, *The American Mathematical Monthly* **100** (1993), 119–137. The author illustrates Newton's geometrical approach in the *Principia* with five examples illustrating the idea of transmuting the linear field into a gravitational field. He shows how Newton's approach provides an elementary, intuitive approach to complex analysis. (DEZ) #21.2.85

NISSEN, HANS J., DAMEROW, PETER, AND ENGLUND, ROBERT K. *Archaic Bookkeeping: Writing and Techniques of Economic Administration in the Ancient Near East*, trans. Paul Larsen, Chicago: Univ. of Chicago Press, 1994, xi + 169 pp, hardbound, $34.95. This book presents recent findings of proto-cuneiform script from the Babylonians at the end of the fourth millennium BC. Although most of the tablets that are described in the book deal with the administration of local economies by means of a numerical system, several tablets show the earliest development of the sexagesimal place value system. The mathematical cuneiform texts described on pp. 142–151 suggest a particularly early encounter with the concept of zero. Computer-generated graphics are keyed to the discussion. (DEZ) #21.2.86

OTERO, DANIEL. An Historical Calculus Course for Liberal Arts Students, *Newsletter of the International Study Group on the Relations Between History and Pedagogy of Mathematics* **28** (March 1993), 7–10. Description of a freshman honors course in calculus at Xavier University for students who are not necessarily mathematics majors, based on reading works of the creators of the subject. *See* #21.2.71. (VJK) #21.2.87

OTERO, MARIO H. Los *Annales de Mathématiques Pures et Appliquées, Mathesis (México)* **9** (1993), 209–224. Bibliometric study of Gergonne's *Annales*. (VA) #21.2.88

OTERO, MARIO H. Un cambio sustancial reciente en la concepión de la filosofía de las matemáticas y sus consecuencias para la historiagrafía de éstas [A Recent Substantial Change in the Conception of the Philosophy of Mathematics and its Consequences for the Historiography of Mathematics], *Mathesis (México)* **8** (1992), 389–401. (VA) #21.2.89

OZHIGOVA, E. P. *See* #21.2.134.

PATY, MICHEL. Physical Geometry and Special Relativity. Einstein and Poincaré. Pp. 127–149 in #21.2.14. The author outlines Einstein's conception of the geometry representing physical space. He compares Einstein's thought with that of Poincaré and contrasts his ideas relative to general and special relativity. (PLW) #21.2.90

PEKONEN, OSMO. The Heavenly Spheres Regained, *The Mathematical Intelligencer* **15**(4) (1993), 27–36. Connects medieval ideas about heavenly spheres to several 20th-century theorems on n-spheres. (TLB) #21.2.91

PENGELLEY, DAVID J. *See* #21.2.70 and #21.2.71.

PERL, TERI. *Women and Numbers: Lives of Women Mathematicians Plus Discovery Activities*, San Carlos, CA: Wide World Publishing/Tetra House, 1993. Biographies of Mary Somerville, Ada Lovelace, Mary Everett Boole, Emmy Noether, Lenore Blum, Evelyn Boyd Granville, Fanya S. Montalvo, Edna Lee Paisano, Jean Darling, Sally Handy-Zarnstorff, Kathi Dwelle, and Theoni Pappas. Projects are included for students to work on in conjunction with the life of each mathematician. (MF) #21.2.92

PETERSON, IVARS. Knotty Views, *Science News* **141** (March 21, 1992), 186–187. Traces the history of knot theory over the last decade, based on a lecture by Joan Birman. (SCC) #21.2.93

PETITOT, JEAN. Actuality of Transcendental Aesthetics for Modern Physics. Pp. 273–304 in #21.2.14. Refutes Hans Reichenbach's theory of logical empiricism as the sole scientific philosophy and argues

that "the transcendental point of view about objectivity provides the effective physico-mathematical sciences with an adequate and natural epistemology." Includes a complete outline of the paper. (DDF) #21.2.94

QŪHĪ, AL. *See* #21.2.108.

RAJAGOPAL, P. Book Review, *Gaṇita-Bhāratī. Bulletin of the Indian Society for History of Mathematics* **14** (1992), 84–85. A review of Swami Satya Prakash Sarasvati, *Geometry in Ancient India,* Delhi: Govindram Hasanand, 1987. (HK) #21.2.95

RANGACHARI, M. S. Book Review, *Gaṇita-Bhāratī. Bulletin of the Indian Society for History of Mathematics* **14** (1992), 80–82. A review of Ishwarbhai Patel (ed.), *Science and the Vidas,* Bombay: Somaiya Publications, 1984. (HK) #21.2.96

RANKIN, ROBERT A. Mathematics, in *A Century of Science in the University of Glasgow,* ed. Robert Young Thompson, Glasgow: Univ. of Glasgow, 1993, pp. 19–31. A history of the Mathematics Department at the University of Glasgow that discusses the faculty (including George Sinclair, appointed to the first Chair in 1691, Robert Simson, Hugh Blackburn, William Jack, and Robert A. Rankin), some distinguished students (notably Colin MacLaurin), the buildings, the courses offered, its modern journal, and relations with the departments of statistics and astronomy. (DEZ) #21.2.97

RASHED, ROSHDI. *See* #21.2.108.

RASSIAS, THEMISTOCLES M. (ed.), *The Problem of Plateau—A Tribute to Jesse Douglas and Tibor Radó,* Singapore: World Scientific Publishing Co., 1992, x + 335 pp., $94. The first section recounts the lives and works of Plateau, Douglas, and Radó. The second collects recent work on Plateau's Problem. [Adapted with permission from *The American Mathematical Monthly* **101** (1994), 96.] (JO) #21.2.98

REGGE, TULLIO. Physics and Differential Geometry. Pp. 270–272 in #21.2.14. Discusses post-Einstein proposals for the final unified theory in which gravitation and electromagnetism appear as a single entity. Includes proposals put forth by H. Weyl and Kaluza and Klein. (DDF) #21.2.99

RESTREPO SIERRA, GUILLERMO. Descartes y la ciencia moderna [Descartes and Modern Science], *Lecturas Matemáticas* **13** (1992), 25–51. *See also* #21.2.72 and #21.2.110. (VA) #21.2.100

REYNOLDS, BARBARA E. The Algorists vs. the Abacists: An Ancient Controversy on the Use of Calculators, *The College Mathematics Journal* **24** (1993), 218–223. A discussion of the controversy that surrounded the use of Roman numerals, the Hindu–Arabic number system, and abaci. (DEZ) #21.2.101

RIBENBOIM, PAULO. Los récords de los números primos [The Prime Numbers Records], *Lecturas Matemáticas* **12** (1991), 137–158. (VA) #21.2.102

RIOJA, ANA. Orden implicado "versus" orden cartesiano. Reflexiones en torno a la filosofía de David Bohm [Implicit Order Versus Cartesian Order. Reflections on David Bohm's Philosophy], *LLULL* **15** (1992), 369–394. A review and analysis of the antipositivist philosophy proposed in the work of physicist David Bohm. (VA) #21.2.103

RODRÍGUEZ CONSUEGRA, FRANCISCO. Carnap, Quine, Gödel y la distinción analítico sintético [Carnap, Quine, Gödel and the Analytic–Synthetic Distinction], *Mathesis (México)* **9** (1993), 241–240. The philosophy of mathematics of Frege, Russell, Wittgenstein, Carnap, Quine, and Gödel is related to the distinction between analytic and synthetic statements in mathematics. (VA) #21.2.104

RODRÍGUEZ CONSUEGRA, FRANCISCO. El convencionalismo y la analogía entre matemática y física [Conventionalism and the Analogy between Mathematics and Physics], *Mathesis (México)* **8** (1992), 425–440. The author tries to find a clear link between the mathematics–physics parallelism as viewed

by Quine and Tarski, and conventionalism, in the holistic sense of Poincaré, Duhem, and Gödel (some of whose unpublished manuscripts are used in the discussion). (VA) #21.2.105

ROSENFELD, B. *See* #21.2.2.

ROWE, DAVID E. Klein, Lie, and the "Erlanger Programm." Pp. 45–54 in #21.2.14. Begins with a brief look at the origins of the "Erlanger Programm" of F. Klein. The remainder of the article discusses the line geometry of Plücker and Klein, and, in particular, how this work influenced Klein's broader conception of geometry as outlined in the "Erlanger Programm." (DDF) #21.2.106

RUBIANO, GUSTAVO NEVARDO. Acerca de la literatura matemática y su utilización [On Mathematical Literature and its Use], *Matemáticas: Enseñanza Universitaria (Nueva Serie)* **2**(2) (1992), 59–72. (VA) #21.2.107

RUIZ, CONCEPCIÓN. *See* #21.2.77.

SAHL, IBN, QŪHĪ, AL, AND AL-HAYTHAM, IBN. *Géométrie et dioptrique aux X–XIe siècles*, ed. Roshdi Rashed, Paris: Les Belles Lettres, 1993, cliii + 315 pp., 1300 FF., hardcover. A translation into French of, and commentary on, a previously unknown text by Ibn Sahl on optics and particularly dioptrics. This work was known to Ibn al-Haytham and, as the publication notice states, "[b]ecause of this book, we can rewrite the history of dioptrics. No longer is Alhazen the isolated individual we thought he was, and it was not in the 16th century that research on lenses and dioptics began, but fully six centuries earlier!" The text also includes studies on lenses by al-Haytham and a commentary on one of them by al-Fārisī. (KVHP) #21.2.108

SALANSKIS, JEAN-MICHEL. Le continu contre l'espace. Pp. 250–264 in #21.2.14. The author examines the relationship between space and the continuum, both in terms of modern mathematics and in the philosophical works of Hegel and Kant. He concludes that the philosophical formulation found in Hegel's thought of the conflict between the two concepts is not consistent with the style and modes of mathematical thought. (PLW) #21.2.109

SALANSKIS, JEAN-MICHEL. *See also* #21.2.14.

SÁNCHEZ, CLARA HELENA. Guillermo Restrepo Sierra, Premio Nacional de Matemáticas 1992 [Guillermo Restrepo Sierra, Winner of the Colombian National Prize in Mathematics], *Matemáticas: Enseñanza Universitaria (Nueva Serie)* **2**(2) (1992), 1–16. Interview. *See also* #21.2.72 and #21.2.100. (VA) #21.2.110

SCHMANDT-BESSERAT, DENISE. *Before Writing*, two vols., Austin, TX: Univ. of Texas Press, 1993; Volume I, *From Counting to Cuneiform*, 304 pp, $60; Volume 2, *A Catalog of Near Eastern Tokens*, 544 pp., $85. This work documents and discusses the discovery of small clay objects, "tokens," found in archaeological digs throughout the Middle East. The author proposes the theory that these tokens were initially employed as concrete counting devices and at a latter period were impressed into clay tablets. Thus their imprint communicated numerical information. Eventually these imprints became the basis for the pictograms giving rise to a system of writing. A good research basis for the author's hypotheses is provided. (FS) #21.2.111

SCHOLZ, ERHARD. Riemann's Vision of a New Approach to Geometry. Pp. 22–34 in #21.2.14. Presents Riemann's contributions to geometry as one of the rare "epistemological turns" in the history of mathematics. Discusses the influence of the ideas of C. F. Gauss and J. F. Herbart on Riemann. (DDF) #21.2.112

SERVATIUS, BRIGITTE. *See* #21.2.48.

SERVATIUS, HERMAN. *See* #21.2.48.

SHAFROTH, CHANTAL. Mathematician, Musician, and Cook, *Focus* **13** (1993), 8–11. A personal perspective on Jean Dieudonné (1906–1992.) Includes photographs. (DEZ) #21.2.113

SHEINGORN, MARK. *See* #21.2.67.

SHENITZER, A., AND STEPRĀNS, J. The Evolution of Integration, *The American Mathematical Monthly* **101** (1994), 66–72. Outline of integration theory in the Greek period, the 17th century, and the 20th century, ending with a discussion of the perfect integral. (DEZ) #21.2.114

SHENITZER, A. *See also* #21.2.66.

SHIRYAYEV, A. N. *Selected Works of A. N. Kolmogorov, Volume III: Information Theory and the Theory of Algorithms,* trans. A. B. Sossinsky, Mathematics and Its Applications, Vol. 27, Norwell, MA: Kluwer Academic, 1993, xxv + 275 pp., $132. A lengthy biography followed by 12 major papers by A. N. Kolmogorov. [Adapted with permission from *The American Mathematical Monthly* **101** (1994), 96.] (TAV) #21.2.115

SHUKLA, K. S. Book Review, *Gaṇita-Bhāratī. Bulletin of the Indian Society for History of Mathematics* **14** (1992), 91–93. A review of David Pingree (ed.), *Rajamrganka of Bhojaraja,* Aligarh: Vireka Publications, 1987. (HK) #21.2.116

SIEGMUND-SCHULTZE, REINHARD. Dealing with the Political Past of East German Mathematics, *The Mathematical Intelligencer* **15**(4) (1993), 27–36. Discusses the interplay between professional and political activity of mathematicians in East Germany between 1946 and 1962 and the problems of East German mathematicians in reunified Germany. (TLB) #21.2.117

SIMILI, RAFFAELLA (ed.) *Scienza, technologia e istituzioni in Europa: Vito Volterra e l'origine del CNR,* Rome/Bari: Laterza, 1993, vii + 202 pp., hardbound, 30000 lire. A collection of 13 papers on teh influence of Vito Volterra on the origin of the CNR. Papers of mathematical interest: "Vito Volterra matematico e organizzatore scientifico" by Alberto Conte, "La communità dei matematici italiani e Vito Volterra" by Judith R. Goodstein, "L'insegnamento europeo della matematica nei primi due decenni del secolo: Alcune rassegne pubblicate e non pubblicate" by Ivor Grattan-Guinness, and "Vito Volterra: il suo percorso" by Rita Levi Montalcini. (IGG) #21.2.118

SINACEUR, HOURYA. De la géométrie formelle à l'algèbre abstraite. Pp. 167–174 in #21.2.14. A discussion of David Hilbert's *Grundlagen der Geometrie.* The author considers Hilbert's success in integrating mathematical philosophy with the practice of mathematics through his use of axiomatization. (PLW) #21.2.119

SINGAL, A. R. Book Review, *Gaṇita-Bhāratī. Bulletin of the Indian Society for History of Mathematics* **14** (1992), 96–98. A review of Anton Glaser, *History of Binary and Other Nondecimal Numeration,* Los Angeles: Tomash Publishers, 1981. (HK) #21.2.120

SOBOLEV, V. S. *See* #21.2.134.

SOKOLIK, MERLE A. *See* #21.2.80.

SOLÍS SANTOS, CARLOS. La geometría en la máquina y la máquina en la naturaleza—la ingeniería Alejandrina [Geometry in Machines and Machines in Nature: Alexandrian Engineering], *Mathesis (México)* **8** (1992), 425–440. Alexandrian engineering is viewed as a bridge built between Greek pure mathematics and the study of physical nature as applied to the construction of machines, which in turn promoted experimentation and research in "applied mathematics." (VA) #21.2.121

SOLÍS SANTOS, CARLOS. Retórica y geometría: Galileo, los Jesuitas y los cometas [Rhetoric and Geometry. Galileo, the Jesuits, and Comets], *Mathesis (México)* **9** (1993), 179–207. Galileo's geometrical and rhetorical written approaches expound his theories according to whether they possess conclusive proofs or arguments. (VA) #21.2.122

SOSSINSKY, A. B. *See* #21.2.115.

STEIN, SHARYN L. Young's Vision, *The Mathematics Teacher* **86** (1993), 330–333. The book *The Teaching of Mathematics*, first published in 1906 by Jacob William Albert Young (1865–1948), is viewed as a forerunner of the NCTM's *Curriculum and Evaluation Standards*. (DEZ) #21.2.123

STEPRĀNS, J. *See* #21.2.114.

STUDY, EDUARD. *See* #21.2.73.

SWADE, DORON. Redeeming Charles Babbage's Mechanical Computer, *Scientific American* **268** (2), 86–91. The author reports that Babbage's plans for Difference Engine No. 2 were essentially correct, and that the shortcomings of Victorian engineering, not design, led to the failure of the project. The author and his colleagues produced a flawlessly functioning Difference Engine #2 in 1991. (DNSH) #21.2.124

SWETZ, FRANK. Fifteenth and Sixteenth Century Arithmetic Texts: What Can We Learn from Them?, *Science & Education* **1** (1992), 365–378. A study of the earliest published arithmetic texts in Europe, illustrating the kinds of problems included. (VJK) #21.2.125

TAYLOR, HAROLD, AND TAYLOR, LORETTA. *George Pólya: Master of Discovery*, Palo Alto, CA: Dale Seymour Publications, 1993, x + 166 pp., paperbound, $15.95. A treatise on the life and work of George Pólya, from his birth in 1887 in Hungary to his death in 1985 in California. Although it is richly illustrated with anecdotes about Pólya and the mathematicians with whom he worked, the story line is choppy at times and difficult to follow. (PLG) #21.2.126

TAYLOR, LORETTA. *See* #21.2.126.

TEISSIER, BERNARD. Apparent Contours from Monge to Todd. Pp. 55–62 in #21.2.14. Defines apparent contours, states a natural problem that arises in their mathematical study, and traces the progress on this problem through the works of Monge, Poncelet, Plücker, Cayley, H. J. S. Smith, Salmon, and Todd, among others. (DDF) #21.2.127

THOM, RENÉ. Un panorama des mathématiques. Pp. 184–191 in #21.2.14. The author organizes what he sees as the essential topics in mathematics around the dependence of the continuous on the discrete as well as on the distinction between the two concepts. (PLW) #21.2.128

THOMPSON, ROBERT YOUNG. *See* #21.2.97.

TREITZ, KLAUS. The Jubilee Maze, *The Mathematical Intelligencer* **15**(4) (1993), 54–57. A short history of labyrinths and a description of the maze and museum of mazes at Sygmonds Yat in England, built to commemorate Queen Elizabeth's Silver Jubilee in 1977. (TLB) #21.2.129

VEA MUNIESA, FERNANDO. *Las matemáticas en la enseñanza secundaria en España en el Siglo XIX [Mathematics in High-School Teaching in 19th Century Spain]*, Doctoral Dissertation, Universidad de Zaragoza, 1992. (VA) #21.2.130

VEGA, LUIS. Los elementos de geometría y el desarrollo de la idea de demostración [The Elements of Geometry and the Development of the Idea of Proof], *Mathesis (México)* **8** (1992), 403–423. Viewing Proclus's *Commentary* critically as an information source, the contribution of the Greek tradition of the elements is assessed in the development of the classical idea of mathematical proof. (VA) #21.2.131

VEGA, LUIS. ¿Pruebas o demostraciones? Problemas entorno a la idea de demostración matemática [Proofs or Demonstrations? Problems about the Idea of Mathematical Demonstration], *Mathesis (México)* **9** (1993), 155–177. The paper deals with the idea of demonstration as conclusive proof, in close relation to the status and nature of mathematical knowledge, including the logical, epistemological, and pragmatic aspects of this special kind of proof. (VA) #21.2.132

VIZGUIN, VLADIMIR P. La conquista de la física por el espíritu de la matemática y su repercusión en la literatura [The Conquest of Physics by the Spirit of Mathematics and its Repercussion in Literature], *LLULL* **15** (1992), 429–441. The role of mathematics in the scientific revolution in physics at the beginning of the 20th century is considered on the basis of two novels: R. Musil's *Der Mann ohne Eigenschaften* (1930) and C. P. Snow's *The Search*. (VA) #21.2.133

VLADIMIROV, V. S., OZHIGOVA, E. P., AND SOBOLEV V. S. (eds.) *The Correspondence of V. A. Steklov with Mathematicians* [in Russian], Leningrad: Nauka, 1991, 376 pp. This book contains the correspondence of Vladimir Andreevich Steklov, mainly with A. M. Lyapunov, A. N. Krylov, N. M. Krylov, and A. A. Markov. In an autobiographical section Steklov writes about his life in mathematics, meetings with Russian scientists (D. A. Grave, I. M. Sechenov) and European mathematicians (Darboux, Picard, Mittag-Leffler, Volterra, and Levi-Civita), his family, and his education. There is a list of Steklov's 177 publications in mathematical physics, quadrature formulas, and differential equations. Some of Steklov's nonmathematical writings, like his theory about two kinds of Jews (p. 250), are confusing. (DEZ) #21.2.134

VOLKERT, KLAUS. Mathematical Progress as Synthesis of Intuition and Calculus. Pp. 194–198 in #21.2.14. Considers the roles of intuition and calculation in mathematical thinking. Discussing Gauss's proof of the fundamental theorem of algebra, non-Euclidean geometry and Poincaré's topology, the author argues that, historically, harmony between intuition and calculation has been established case-by-case in mathematics, sometimes by changing the calculus to match intuition and sometimes by altering intuition "in order to make the unintuitive more intuitive." (PLW) #21.2.135

WEISS, ERIC A. Obituary: John George Kemeny, *IEEE Annals of the History of Computing* **15** (1993), 58–60. A summary of the life and work of J. G. Kemeny (1926–1992), the president of Dartmouth College known for developing the computer language BASIC with Thomas E. Kurtz. (LSG) #21.2.136

WEISS, ERIC A. (ed.) Eloge: An Wang, 1920–1990, *IEEE Annals of the History of Computing* **15** (1993), 60–69. A summary of the life and work of An Wang, who developed the basic concept of ferrite-core memory and founded Wang Laboratories, which developed the first desktop computer. His name was long associated with word processing. (LSG) #21.2.137

WESTFALL, RICHARD S. *The Life of Isaac Newton,* Cambridge: Cambridge Univ. Press, 1993, xxii + 328 pp., $24.95. A condensed version of the author's award-winning biography *Never at Rest: A Biography of Isaac Newton*. This shorter, less technical version aims at a general audience. [Adapted with permission from *The American Mathematical Monthly* **101** (1994), 95.] (HD) #21.2.138

WILSON, ROBIN. Islamic Mathematics and Astronomy, I, *The Mathematical Intelligencer* **15**(4) (1993), 74. This instance of Wilson's Stamp Corner shows stamps of al-Khowarizmi, al-Biruni, ibn Sina, and ibn al-Haitham from the Soviet Union, Dubai, Pakistan, and Qatar. (TLB) #21.2.139

WILSON, ROBIN J. *See also* #21.2.40 and #21.2.41.

ZHANG, BO. C. N. Yang and Contemporary Mathematics, *The Mathematical Intelligencer* **15**(4) (1993), 13–21. An interview with mathematical physicist C. N. Yang. Matters discussed include Yang–Mills Theory, gauge theory, fiber bundles, mathematicians S. S. Chern, J. Simons, M. F. Atiyah, and I. M. Singer, and the connections between mathematics and physics. (TLB) #21.2.140