

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 17, Number 1, are numbered: 17.1.1, 17.1.2, 17.1.3, 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 Irving Anellis (Ames, IA), Thomas L. Bartlow (Villanova, PA), Gary Brown (Collegeville, MN), Laura Chihara, (Northfield, MN), Albert C. Lewis (Hamilton), Karen V. H. Parshall (Charlottesville), Lynn Arthur Steen (Northfield, MN), Patti Lynn Wilger ((Charlottesville), and David E. Zitarelli.

ACCADEMIA NAZIONALE DE SCIENZE, LETTERE, E ARTI. 1992. *Contributi alla Storia delle Matematiche: Scritti in Onore di Gino Arrighi*. Modena: Mucchi. 156 pp. Paperbound. A collection of eight essays honoring the career of GINO ARRIGHI, together with an introduction by Giuseppe Gemignani, an appreciation of Gino Arrighi by Laura Toti Rigatelli, a BIBLIOGRAPHY (compiled by Carla Simonetti) of Arrighi's works in the history of science, and several analytical indices. Essays by Laura Toti Rigatelli, Gino Arrighi, Raffaella Franci, Paolo Freguglia, and Clara Silvia Roero are abstracted separately. (KVHP) #20.3.1

ACHAR, B. N. NARAHARI. *See* #20.2.104.

ALBORN, TIMOTHY L. 1992. Book review. *Isis* 83(2), 366–367. A review of *The taming of chance* by Ian Hacking (*See* #19.1.40.) Hacking argues that probabilism fostered a gradual rethinking of traditional Enlightenment ideas about the relations between reason, nature, and society. PROBABILITY. (GB) #20.3.2

ARRIGHI, GINO. 1992. Problemi e proposte de matematica medievale [Problems and proposals in medieval mathematics]. Pp. 9–18 in #20.3.1. The author sketches some of the difficulties—transcriptional, linguistic, etc.—involved in dealing with MEDIEVAL CODICES, by means of several examples. (KVHP) #20.3.3

- ARRIGHI, GINO. 1992. Sopra une memoria leibniziana del 1684 [On a 1684 memoir by Leibniz]. Pp. 35–40 in #20.3.1. A close textual study of several points from the first half of LEIBNIZ's "Nova methodus pro maximis et minimis . . ." published in the *Acta Eruditorum* in 1684. (KVHP) #20.3.4
- BARBIERI, FRANCESCO, AND PEPE, LUIGI (Eds.) 1992. *Bibliografia italiana di storia delle matematiche 1961–1990*. Editrice Compositori. 181 pp. Paperbound. A BIBLIOGRAPHY of 3053 works published between 1961 and 1990 by Italians on the history of mathematics. Also includes a chronological classification of works and a name index. ITALY. 20TH CENTURY. (KVHP) #20.3.5
- BARG, ALEXANDER. 1993. At the dawn of the theory of codes. *The Mathematical Intelligencer* 15(1), 20–26. The author provides a historical introduction to the theory of codes. "I want to bring together a series of mathematical stories that form a part of the history (or the prehistory) of CODING THEORY." (TLB) #20.3.6
- BEAULIEU, LILIANE. 1993. A Parisian café and ten proto-Bourbaki meetings (1934–1935). *The Mathematical Intelligencer* 15(1), 27–35. Describes the birth of the BOURBAKI group at the Café Capoulade in Paris' Latin Quarter. (TLB) #20.3.7
- BECHLER, ZEV. 1992. Newton's ontology of the force of inertia. Pp. 287–304 in #20.3.62. A refutation of the theory that NEWTON's physics presupposed a distinction between natural and enforced motion. The author argues that Newton viewed the force of INERTIA as separate from matter and that the traditional interpretation blurs the difference between Aristotelian and 17th-century PHYSICS. (PLW) #20.3.8
- BELLUR, SRINATH. *See* #20.2.104.
- BERTI, ENRICO. 1991. Les méthodes d'argumentation et de démonstration dans la *Physique* (Apories, phénomènes, principes) [Methods of argumentation and demonstration in the *Physics* (Aporias, Phenomena, Principles)]. Pp. 53–72 in #20.3.31. Examines the epistemological status of PHYSICS in the works of ARISTOTLE. Among other topics, the author examines how Aristotle uses physics to uncover the principles of nature and the various causes, and explores Aristotle's use of dialectical reasoning. (KVHP) #20.3.9
- BERTOLONI MELI, DOMENICO. 1992. St. Peter and the rotation of the earth: The problem of fall around 1800. Pp. 421–447 in #20.3.62. The author provides a case study on the interdependence between THEORY AND EXPERIMENT by examining the investigation of falling objects at the turn of the 19TH CENTURY. He considers the experiments and theories of Gianbattista Guglielmini, Jerome Lalande, Pierre Simon Laplace, Johann Friedrich Benzenberg, Wilhelm Olbers, and Carl Friedrich Gauss. (PLW) #20.3.10
- BOLZANO, BERNARD. 1993. *Les paradoxes de l'infini*. Paris: Éditions du Seuil. 192 pp. Paperbound. 140 F. French translation of BERNARD BOLZANO's *Paradoxien des Unendlichen* (1851) by Hourya Sinaceur. Introduction by the translator, pp. 11–38. Bibliography of the various editions of this work, as well as Bolzano's published works and secondary studies on Bolzano and his mathematical ideas, pp. 39–47. (KVHP) #20.3.11
- BOS, HENK J. M. 1992. Descartes, Pappus' problem and the Cartesian parabola: A conjecture. Pp. 71–96 in #20.3.62. A discussion of the connections between various occurrences of the Cartesian parabola in the *Géométrie*. The author argues for the influential role of DESCARTES' study of PAPPUS' PROBLEM in the development of his geometrical thought. GEOMETRY. (PLW) #20.3.12
- BRACKENRIDGE, J. BRUCE. 1992. The critical role of curvature in Newton's developing dynamics. Pp. 231–260 in #20.3.62. Discusses the role of CURVATURE in the DYNAMICS of ISAAC NEWTON from his early work to the revised edition of the *Principia*. Using Newton's work on curvature, the author develops a proof of the "inverse problem" of finding the path of motion given the force and the force center. (PLW) #20.3.13

- BRAGUE, RÉMI. 1991. Note sur la définition du mouvement (*Physique*, III, 1–3) [Note on the definition of movement (*Physics*, III, 1–3)]. Pp. 107–120 in #20.3.31. A close examination of the precise meaning ARISTOTLE assigned to his definition of MOTION in *Physics*, III, 1, 201a, 10ff. (KVHP) #20.3.14
- BREGER, H. 1992. Tacit knowledge in mathematics. Pp. 79–90 in #20.3.34. Identifies aspects of the mathematical world that are not usually treated by philosophers or historians such as insight and the know-how enabled by AXIOMATIZATION. (ACL) #20.3.15
- BRUNSCHWIG, JACQUES. 1991. Qu'est-ce que la *Physique* d'Aristote? [What is the *Physics* of Aristotle?]. Pp. 11–40 in #20.3.31. A brief discussion of the various editions—ancient and modern—of ARISTOTLE'S *Physics* and of the panoply of problems surrounding the use of EDITED TEXTS. (KVHP) #20.3.16
- BUCHHEIM, R. See #20.3.86.
- BUCHWALD, JED Z. 1985. Oliver Heaviside, Maxwell's apostle and Maxwellian apostate. *Centaurus* 28, 288–330. Account of the eccentric OLIVER HEAVISIDE'S background, work, and negative reception amongst the Maxwellians to his recasting of MAXWELL'S theory. (ACL) #20.3.17
- BUCHWALD, JED Z. 1992. Why Stokes never wrote a treatise on optics. Pp. 451–476 in #20.3.62. The author traces the development of some of GEORGE GABRIEL STOKES'S research on OPTICS and discusses possible explanations for his unwillingness to pursue research and publishing later in life. (PLW) #20.3.18
- BULIRSCH, ROLAND. 1992. Mathematik und Informatik—Vom Nutzen der Formeln. *Alexander von Humboldt Stiftung Mitteilungen* 60, 3–14. Apologia for mathematics and informatics that draws upon the relations between the ARTS AND MATHEMATICS. Examples include the writings of Novalis and Edgar Allan Poe. One of the more unusual cases is a comparison of the mathematician ALFRED PRINGSHEIM with the writer THOMAS MANN. Mann married Pringsheim's daughter, Katja. The many illustrations include a portrait of Katja and photos of the Pringsheim palace. (ACL) #20.3.19
- BURCHSTED, FREDERIC F. 1993. New archives of American mathematics collections. *Historia Mathematica* 20(1), 92–94. Brief descriptions of collections of various AMERICAN MATHEMATICIANS and records from the journal *Linear Algebra and its Applications*. (DEZ) #20.3.20
- BUSARD, H. L. L. See #20.3.70.
- CASTELLANA, MARIA. 1992. L'Expérience mathématique [Mathematical experience]. Pp. 127–136 in #20.3.99. Within the context of the history of the philosophy of the sciences and the history of epistemology, the author looks at the NEORATIONALIST TRADITION founded by ENRIQUES through the perspective of one of its adherents, Gonseth. (KVHP) #20.3.21
- COHEN, I. BERNARD. 1992. The review of the first edition of Newton's *Principia* in the *Acta Eruditorum*, with notes on the other reviews. Pp. 323–353 in #20.3.62. A comparison of four REVIEWS of the *Principia*, with a detailed discussion of that of a little-known reviewer, CHRISTOPH PFAUTZ. ISAAC NEWTON. (PLW) #20.3.22
- COUCHOUD, SYLVIA. 1986. Essai d'une nouvelle interprétation du premier problème du Papyrus Mathématique Démotique 10520 du British Museum. *Centaurus* 29, 1–4. A new interpretation of the first problem in a mathematical Demotic papyrus from the ROMAN EPOCH. ARITHMETICAL PROGRESSIONS. (ACL) #20.3.23
- CROMWELL, PETER R. 1993. Celtic knotwork: mathematical art. *The Mathematical Intelligencer* 15(1), 36–47. A mathematical analysis, in terms of SYMMETRY GROUPS, of CELTIC decorative ART. ETHNOMATHEMATICS. (TLB) #20.3.24
- DA COSTA, N. C. A., AND DORIA, F. A. 1992. Suppes predicates for classical physics. Pp. 168–191 in #20.3.34. Explores the consequences of mathematical and metamathematical concepts in THEORETICAL PHYSICS. PHILOSOPHY OF MATHEMATICS. (ACL) #20.3.25

- DALMEDICO, AMY DAHAN. 1992. *Mathématisations: Augustin-Louis Cauchy et l'École française*. Argenteuil: Éditions du Choix. 460 pp. An historical analysis of the work of AUGUSTIN-LOUIS-CAUCHY in MATHEMATICAL PHYSICS within the context of the FRENCH MATHEMATICAL COMMUNITY of the first half of the 19TH CENTURY. Divided into five parts, the book opens with a discussion of 18th-century developments that served as the foundation for Cauchy's work and moves to a discussion of the work particularly of SOPHIE GERMAINE and JOSEPH FOURIER before examining closely Cauchy's research on wave propagation, the integration of partial differential equations, and the theory of elasticity. The book closes with an examination of FRESNEL's theory of light. (KVHP) #20.3.26
- DAUBEN, J. 1992. Are there REVOLUTIONS IN MATHEMATICS? Pp. 205–229 in #20.3.34. In answering in the affirmative, the author uses examples that include the development of rigor in the calculus, CANTOR's development of transfinite SET THEORY, and ABRAHAM ROBINSON'S NONSTANDARD ANALYSIS. (ACL) #20.3.27
- DAUBEN, JOSEPH W. 1993. A 20th anniversary message from the International Commission on the History of Mathematics. *Historia Mathematica* 20(1), 1–4. A reflection on the aspirations of KENNETH MAY and an exhortation to historians of mathematics to attend the 19th International Congress of HISTORY OF SCIENCE in Zaragoza, Spain, on August 22–29, 1993. (DEZ) #20.3.28
- DAVIS, PHILIP J. 1993. Applied mathematics as social contract. Pp. 182–194 in #20.3.113. Discusses mathematics as a social construct. The author argues that mathematics education must be altered in order to effect a fuller understanding of the role of MATHEMATIZATION IN SOCIETY and of mathematical practice. (KVHP) #20.3.29
- DE GANDT, FRANÇOIS. 1991. Sur la détermination du mouvement selon Aristote et les conditions d'une mathématisation [On the determination of motion according to Aristotle and on the conditions necessary for mathematization]. Pp. 85–106 in #20.3.31. Points to a tension within the work of ARISTOTLE relative to the concept of MOTION. On the one hand, motion is essentially indeterminate. On the other hand, Aristotle develops a notion of the continuity of motion, which moves him closer to the opposite conclusion. The author also examines Aristotle's use of the mathematics of proportion in his development of the concept of motion. MATHEMATIZATION. (KVHP) #20.3.30
- DE GANDT, FRANÇOIS, AND SOUFFRIN, PIERRE (Eds.) 1991. *La physique d'Aristote et les conditions d'une science de la nature*. Paris: Librairie philosophique J. Vrin. 206 pp. Paperbound. 183 F. A collection of nine essays resulting from an international conference held in Nice in 1986 and dealing with the *Physics* of ARISTOTLE. By examining the *Physics* within the context of both Greek philosophy and science, the essays focus on such issues as the method of Aristotle's natural science, its relationship to mathematics, Aristotle's definition of motion, and his conception of the notions of continuity, speed, and force. The essays, by Jacques Brunschwig, Charles Kahn, Enrico Berti, Nicholas Denyer, François De Gandt, Rémi Brague, Robert Wardy, Hans-Joachim Waschkies, and A. Laks, are abstracted separately. PHYSICS. (KVHP) #20.3.31
- DENYER, NICHOLAS. 1991. Can physics be exact? Pp. 73–84 in #20.3.31. Distinguishes between celestial and terrestrial PHYSICS in the work of ARISTOTLE and examines the degree of "fit" that Aristotle expects terrestrial physics can reasonably have with the natural world. (KVHP) #20.3.32
- DHOMBRES, JEAN. See #20.3.66.
- DHOMBRES, NICOLE. See #20.3.66.
- DORIA, F. A. See #20.3.25.
- ECHVERRÍA, J. 1992. Observations, problems and conjectures in number theory—The history of the PRIME NUMBER THEOREM. Pp. 230–252 in #20.3.34. The empirical element in number theory is exemplified by the role of TABLES in proving or disproving hypotheses. (ACL) #20.3.33
- ECHVERRÍA, J., IBARRA, A., AND MORMANN, T. (Eds.) 1992. *The space of mathematics: philosophical, epistemological, and historical explorations*. Berlin/New York: Walter de Gruyter, xvii + 422 pp. DM 228.00. (Foundations of Communication and Cognition: Library Edition. R. Posner and G.

Meggle, Eds.) A selection of 23 articles based on papers presented at the 1990 symposium "Structures in Mathematical Theories" held at the University of the Basque Country in Donostia/San Sebastian (Basque Country, Spain). Individual papers relating to HISTORY OF MATHEMATICS by the following are abstracted separately: H. Breger; N. C. A. Da Costa and F. A. Doria; J. Dauben; J. Echeverria; S. Feferman; I. Grattan-Guinness; C. Howson; A. Ibarra and T. Mormann; H. N. Jahnke; E. Knobloch; F. W. Lawvere; S. Mac Lane; M. S. Mahoney; J. Mosterin; I. Niiniluoto; M. Otte; V. Rantala; M. D. Resnik; E. Scheibe; H.-J. Schmidt. (ACL) #20.3.34

FEFERMAN, S. 1992. Turing's oracle: From absolute to relative computability—and back. Pp. 314–348 in #20.3.34. Recounts the development of RECURSION THEORY of effective COMPUTABILITY, which began with a concern for absolute compatibility, moved to relative computability, and then returned to the absolute form. (ACL) #20.3.35

FEIGENBAUM, LENORE. 1992. The fragmentation of the European mathematical community. Pp. 383–397 in #20.3.62. An examination of the effects of the NEWTON–LEIBNIZ CONTROVERSY on the mathematical community of their time. The author bases her observations on the correspondence of Brook Taylor, Johann Bernoulli, and Pierre Remond De Monmort. CALCULUS. (PLW) #20.3.36

FELLMANN, EMIL A. 1992. Honoré Fabry (1607–1688) als Mathematiker—Eine Reprise. Pp. 97–112 in #20.3.62. Examples of the use of Cavalieri's METHOD OF INDIVISIBLES by HONORÉ FABRY in his research on infinitesimals. The essay includes a short biography of Fabry and a brief evaluation of his achievements as a physicist. CALCULUS. (PLW) #20.3.37

FIGALA, KARIN, HARRISON, JOHN, AND PETZOLD, ULRICH. 1992. *De Scriptoribus Chemicis*: Sources for the establishment of Isaac Newton's (al)chemical library. Pp. 135–179 in #20.3.62. A presentation and brief evaluation of some hand-written documents providing evidence about the acquisition by ISAAC NEWTON of alchemical papers. Includes an annotated transcription of the primary source for this study, *De Scriptoribus Chemicis*. ALCHEMY. (PLW) #20.3.38

FISCHER, ROLAND. 1993. Mathematics and social change. Pp. 197–218 in #20.3.113. The author argues that mathematics can play an instrumental and beneficial role in what he calls society's "collective self-reflection." MATHEMATICS AND SOCIETY. (KVHP) #20.3.39

FISCHER, ROLAND. 1993. Mathematics as a means and as a system. Pp. 113–133 in #20.3.113. The author recognizes mathematics both as a means for explaining and understanding the world and as a system of concepts, rules, etc. He argues that this duality and the reciprocity between these two aspects of mathematics have traditionally been ignored and uses an analysis of set theory to underscore his point. NATURE OF MATHEMATICS. (KVHP) #20.3.40

FOWLER, D. H. 1992. Newton, Cotes, and $\sqrt{\sqrt{2}}$: A footnote to Newton's theory of the resistance of fluids. Pp. 355–368 in #20.3.62. An explanation of ROGER COTES's method of approximating such quantities as $\sqrt[4]{2}$ using CONTINUED FRACTION EXPANSIONS. Includes a summary of works from Rafael Bombelli to Roger Cotes that treat continued fractions. ISAAC NEWTON. (PLW) #20.3.41

FRANCI, RAFFAELLA. 1992. Gino Arrighi e la storia della matematica medioevale [Gino Arrighi and the history of medieval mathematics]. Pp. 19–28 in #20.3.1. A brief survey of the work of GINO ARRIGHI in the history of mathematics with an appendix listing the various codices he has transcribed and published. MEDIEVAL MATHEMATICS. (KVHP) #20.3.42

FRANCI, RAFFAELLA. 1992. Le matematiche dell'abaco nel quattrocento [The mathematics of the abacus schools in the 15th century.] Pp. 53–74 in #20.3.1. Discusses the diffusion of the works of FIBONACCI and the emergence of the ABACUS SCHOOLS, the so-called "maestri d'abaco," and the content of their various algebraic treatises. ALGEBRA. (KVHP) #20.3.43

FRÅNGSMYR, TORE. See #20.3.59.

FRASER, CRAIG 1985. D'Alembert's principle: The original formulation and application in Jean d'Alembert's *Traité de dynamique* (1743). *Centaurus* 28, 145–159. This, the second part of the study

abstracted in #20.2.33, treats the special uses of D'ALEMBERT'S PRINCIPLE in Chapters 3 and 4 of Part 2 of the *Traité*, small vibrations, collisions, and live forces. (ACL) #20.3.44

FREGUGLIA, PAOLO. 1992. La determinazione di π nella *Practica geometriae* del Fibonacci in un codice del XV secolo [The determination of π in a 15th-century codex of Fibonacci's *Practica geometriae*]. Pp. 75–84 in #20.3.1. An illustrated mathematical discussion of the determination of π given in a codex dating from 1442 by Cristofano di Gherardo di Dino of FIBONACCI'S *Practica geometriae*. (KVHP) #20.3.45

FREGUGLIA, PAOLO. 1992. Sulla geometria di Girard Desargues [On the geometry of Girard Desargues]. Pp. 29–34 in #20.3.1. A brief discussion of the *Brouillon project* of GIRARD DESARGUES. GEOMETRY. (KVHP) #20.3.46

FREI, GÜNTHER. 1993. Bartel Leendert Van Der Waerden. Zum 90. Geburtstag. *Historia Mathematica* 20, 5–11. This dedication to B. L. VAN DER WAERDEN on his 90th birthday includes a synopsis of his academic life, most of which was spent in universities in Zürich, Amsterdam, and Leipzig. Descriptions are given of some of his most influential contributions to algebraic geometry, abstract algebra, group theory, number theory, topology, axiomatic geometry, combinatorics, analysis, probability theory and mathematical statistics, quantum mechanics, history of mathematics, history of modern physics, history of astronomy, and history of ancient science and philosophy. (ACL) #20.3.47

FULLING, S. A., AND NARCOWICH, F. J. 1991. *Forty more years of ramification theory: Spectral asymptotics and its applications*. College Station, TX: Texas A&M Univ. v + 317 pp. Paperbound; \$15.00. Papers on SPECTRAL THEORY, two of which bear historical interest: the 1948 Gibbs Lecture by HERMAN WEYL and the lecture given by BRYCE DEWITT upon receipt of the Dirac Medal of the International Centre for Theoretical Physics. [Adapted with permission from *The American Mathematical Monthly* 100(3) (1993), 311.] (LC) #20.3.48

GABBEY, ALAN. 1992. Newton's mathematical principles of natural philosophy: A treatise on 'Mechanics'? Pp. 305–322 in #20.3.62. An examination of the purpose of ISAAC NEWTON in the *Principia* within the context of a contemporary understanding of MECHANICS as a discipline. The author discusses the appropriateness of that term as a description of Newton's work. (PLW) #20.3.49

GERASIM, I.-CHR. I. 1990. On the origin of L. Rédei's theory of the equation $x^2 - Dy^2 = -1$. *Istoriko-matematicheskie issledovaniya* 32–33, 199–211 [In Russian]. Examines in detail the work on the equation $x^2 - Dy^2 = -1$ by the Hungarian mathematician LÁSZLO RÉDEI (1900–1980) and gives a brief discussion of its historical background, especially in DIRICHLET. DIFFERENTIAL EQUATIONS. (IA) #20.3.50

GERICKE, HELMUTH. See #20.3.83.

GOLDSTEIN, BERNARD R. 1992. Lunar velocity in the Ptolemaic tradition. Pp. 3–17 in #20.3.62. Considers rules of PTOLEMY and REGIOMONTANUS for computing LUNAR VELOCITY. Discusses the use of Ptolemy's rule in tables of lunar velocity of al-Battani, Levi ben Gerson, and some of those in the Alfonsine corpus of the 14th century. (PLW) #20.3.51

GOLLAND, LOUISE AHRNDT, AND GOLLAND, RONALD WILLIAM. 1993. Euler's troublesome series: An early example of the use of TRIGONOMETRIC SERIES. *Historia Mathematica* 20(1), 54–67. A discussion of the role of series expansions of trigonometric functions in two astronomical works of LEONHARD EULER. The authors conclude that "Contrary to Knopp's statement Leonhard Euler did indeed 'trouble himself with questions of convergence.'" (DEZ) #20.3.52

GOLLAND, RONALD WILLIAM. See #20.3.52.

GORDIENKO, N. A. 1990. The concept of "fraction" in H. Grassmann's *Ausdehnungslehre* and its connection with contemporary linear algebra. *Istoriko-matematicheskie issledovaniya* 32–33, 181–199

[In Russian]. Shows the connections between the work of GRASSMANN and that of CAYLEY and HAMILTON, with reference to LINEAR SPACES mapped into n -dimensional vector spaces. (IA)

#20.3.53

GOWING, RONALD. 1992. A study of spirals: Cotes and Varignon. Pp. 371–381 in #20.3.62. A discussion of some of ROGER COTES's works on SPIRALS and the possible influence of PIERRE VARIGNON on those works. (PLW)

#20.3.54

GRATTAN-GUINNESS, IVOR. 1992. Structure-similarity as a cornerstone of the PHILOSOPHY OF MATHEMATICS. Pp. 91–111 in #20.3.34. The notion of STRUCTURE-SIMILARITY of mathematical forms and reasonings bridges the gap between the two philosophical enterprises, usually quite separate, of mathematicians, on the one hand, and of philosophers, on the other. (ACL)

#20.3.55

GRATTAN-GUINNESS, IVOR. *See also* 20.3.66.

GRAY, JEREMY. 1992. Poincaré, topological dynamics, and the stability of the solar system. Pp. 502–524 in #20.3.62. The author examines the mathematical ideas used by POINCARÉ and created in his investigations of PLANETARY ORBITS and discusses his influence on later research. (PLW)

#20.3.56

GRIEDER, ALFONS. 1992. Géométrie, *a priori* et expérience sensorielle chez Gonseth [Geometry, *a priori*, and sensory experience in FERDINAND GONSETH]. Pp. 111–124 in #20.3.99. Explores Gonseth's views on the relationship between mathematics and SENSORY EXPERIENCE and provides a critical assessment of his thought on this point. (KVHP)

#20.3.57

GUICCIARDINI, NICCOLO. *See* #20.3.114.

HACKING, IAN. *See* #20.3.2.

HALL, A. RUPERT. 1992. Newton and the absolutes: Sources. Pp. 261–285 in #20.3.62. An examination of the influences of the writings of ISAAC BARROW, WALTER CHARLETON, and HENRY MORE on NEWTON's METAPHYSICS. (PLW)

#20.3.58

HANKINS, THOMAS. 1992. Book review. *Isis* 83(1), 138–140. A review of *The quantifying spirit in the eighteenth century* by Tore Frängsmyr, J. L. Heilbron, and Robin E. Rider (Eds.) (*See* #18.4.38). The title of this book is a translation of Bernard LeBouër de Fontenelle's term "l'esprit géométrique" which he used in the preface to his 1699 history of the Paris Academy of Sciences. The authors represented in the *Quantifying spirit* have concentrated more on natural history, chemistry, forestry, and the reform in language which is more in keeping with Fontenelle's original estimation of the impulse to quantify. 18TH CENTURY. (GB)

#20.3.59

HARGITTAI, ISTVÁN. 1993. Imperial cuboctahedron. *The Mathematical Intelligencer* 15(1), 58–59. Photos and commentary of cuboctahedra and other GEOMETRIC shapes in ancient Japanese gardens. ETHNOMATHEMATICS. JAPAN. (TLB)

#20.3.60

HARMAN, P. M. 1992. Maxwell and Saturn's rings: Problems of stability and calculability. Pp. 477–502 in #20.3.62. A study of the development of MAXWELL's research on SATURN'S RINGS. The author emphasizes the importance for Maxwell's broader PHYSICS of the problem of the stability of the rings. (PLW)

#20.3.61

HARMAN, P. M., AND SHAPIRO, ALAN E. (Eds.) 1992. *The investigation of difficult things: Essays on Newton and the history of the exact sciences in honour of D. T. Whiteside*. Cambridge: Cambridge Univ. Press. xvi + 531 pp. Hardbound; \$175.00. A collection of 20 essays covering mathematics and ASTRONOMY before NEWTON; Newton's manuscripts; Newton's *Principia*; Newton and 18th-century mathematics and physics; OPTICS and DYNAMICS after Newton. Includes a list of Whiteside's publications. Contributions by Zev Bechler, Domenico Bertoloni Meli, Henk J. M. Bos, J. Bruce Brackenridge, Jed Z. Buchwald, I. Bernard Cohen, Lenore Feigenbaum, Emil A. Fellmann, Karin Figala, D. H. Fowler, Alan Gabbey, Bernard R. Goldstein, Ronald Gowing, Jeremy Gray, A. Rupert Hall, P. M.

Harman, John Harrison, Ulrich Petzold, Alan E. Shapiro, P. E. Spargo, N. M. Swerdlow, and Curtis A. Wilson are abstracted separately. (PLW) #20.3.63

HEILBRON, J. L. See #20.3.59.

HEINZMANN, GERHARD. 1992. La géométrie comme paradigme de l'idonéisme [Geometry as a paradigm of the philosophy of idonéisme]. Pp. 47–54 in #20.3.99. Explores the way in which geometry shaped the ideas of FERDINAND GONSETH in the PHILOSOPHY OF SCIENCE. (KVHP) #20.3.63

HENRIKSEN, MELVIN. 1993. There are too many B. A. D. mathematicians. *The Mathematical Intelligencer* 15(1), 6–9. This OPINION piece reviews the history of RESEARCH SUPPORT in mathematics in the second half of the 20th century and proceeds to a sharp attack on “bigoted and destructive (B. A. D.)” mathematicians who are contemptuous of particular branches of mathematics and particular kinds of research. (TLB) #20.3.64

HENRY, JOHN. 1993. Henry More and Newton's gravity. *History of Science* 31(1), 83–97. This essay review of A. Rupert Hall's *Henry More: Magic, Religion and Experiment* argues against the traditional view that ISAAC NEWTON is indebted to HENRY MORE for his theological ideas. Part of the argument is based on “the mathematical tradition which informed Newton's thinking” and on Newton's understanding of space and gravity. (TLB) #20.3.65

HOFMANN, JAMES R. 1992. Essay review. *Isis* 83(2), 291–297. An essay review of *Convolutions in French mathematics, 1800–1840*, by Ivor Grattan-Guinness (see #18.1.51 and #20.1.6) and of *Naissance d'un nouveau pouvoir: Sciences et savants en France, 1793–1824*, by Nicole and Jean Dhombres. During the 1980s some historians urged that technical reconstructions be fused to broaden the history of FRENCH INSTITUTIONS and cultures. According to the reviewer, this fusion has *not* occurred in the recent publications of Grattan-Guinness and Nicole and Jean Dhombres. The Dhombres explore the broad cultural context in which a French scientific community came of age early in the 19th century. “They do so with minimal technical issues at stake.” On the other hand, with close attention to mathematical detail, Grattan-Guinness links the history of mathematics to the emergence of “mathematical physics.” Stylistically *Convolutions* is encyclopedic. In contrast to the Dhombres's volume, the scope here does not extend beyond the immediate intellectual and social environment of the mathematicians and physicists themselves. (GB) #20.3.66

HOGENDIJK, J. P. 1985. DIOCLES and the geometry of curved surfaces. *Centaurus* 28, 169–184. Discusses a solution to a problem stated in the preface to *On BURNING MIRRORS* (ca. 190 B.C.): “how to find a mirror surface such that when it is placed facing the sun the rays reflected from it meet the circumference of a circle.” (ACL) #20.3.67

HOWSON, C. 1992. Mathematics in philosophy. Pp. 192–201 in #20.3.34. An analysis of the way mathematical theories have influenced philosophy, in particular empirical epistemology. Most of these theories are probabilistic. PHILOSOPHY OF MATHEMATICS. (ACL) #20.3.68

HØYRUP, JENS. 1993. Book review. *Historia Mathematica* 20(1), 99–103. A review of *Indo-European numerals*, edited by Jadranka Gvozdanović. Although the topic of the book is NUMBER WORDS of the INDO-EUROPEAN LANGUAGES and the presentation is highly technical, the book “may still contribute significantly ... to our understanding of the premathematical practice and ‘psychology’ of numbers.” (DEZ) #20.3.69

HUGHES, BARNABAS. 1992. Book review. *Isis* 83(4), 649–650. A review of *Jordanus de Nemore, De Elementis Arithmeticae artis: A medieval treatise on number theory* by H. L. L. Busard. JORDANUS DE NEMORE is reorganized as a preeminent medieval polymath. In *De Elementis Arithmeticae artis* he gathered all available notions about NUMBER THEORY. This text is now available in a critical edition and English paraphrase by H. L. L. Busard. (GB) #20.3.70

IBARRA, A., AND MORMANN, T. 1992. Structural analogies between mathematical and empirical theories. Pp. 31–46 in #20.3.34. Under the banner of “structural analogies” and “cognition is repre-

sentation'' the authors bring notions of C. S. PEIRCE and E. CASSIRER into the discussions started by Lakatos and Quine on analogies between mathematical and empirical theories. *PHILOSOPHY OF MATHEMATICS*. (ACL) #20.3.71

IBARRA, A. *See also* #20.3.34.

JAHNKE, H. N. 1992. A structuralist view of LAGRANGE's algebraic analysis and the German combinatorial school. Pp. 280–295 in #20.3.34. The author plots the change in the view of mathematics from Kant's time, when mathematics was regarded as concerned with space and time, to that of a few decades later in the early 19th century when arithmetic (including algebra and infinitesimal analysis) was the sole constituent of pure mathematics. This change is related to the so-called COMBINATORIAL SCHOOL that based all of ANALYSIS on an algebraic-combinatorial basis. (ACL) #20.3.72

JUNGWIRTH, HELGA. 1993. Reflections on the foundations of research on women and mathematics. Pp. 134–149 in #20.3.113. Examines the underlying assumptions and preconceptions of numerous studies which seek to document the problems, sociological and otherwise, surrounding the issue of WOMEN AND MATHEMATICS. (KVHP) #20.3.73

KATOK, ANATOLE, AND KATOK, SVETLANA. 1993. Women in Soviet mathematics. *Notices of the American Mathematical Society* 40(2), 108–116. A historical study of WOMEN IN MATHEMATICS in the former SOVIET UNION, beginning with the 1920s and ending with an optimistic response to the question whether these mathematicians have a future in the United States. (DEZ) #20.3.74

KATOK, SVETLANA. *See* #20.2.74.

KJELDSSEN, TINNE HOFF. 1993. Early history of the moment problem. *Historia Mathematica* 20(1), 19–44. An account of the evolution of the MOMENT PROBLEM, beginning with the work of CHEBYSHEV in the 1870s on integrals expanded in continued fractions. STIELTJES extended the problem to complex functions. J. GOMMER extended Stieltjes' work. H. L. HAMBURGER established the moment problem as a theory in its own right; then F. HAUSSDORF and R. NEVANLINNA freed it from continued fractions. (DEZ) #20.3.75

KNOBLOCH, E. 1992. Historical aspects of the foundations of error theory. Pp. 253–279 in #20.3.34. The author addresses the following question: Why was there such a long dispute over the foundations of ERROR THEORY and why were there so many proofs of it in the 19th century? C. F. GAUSS. P. S. M. DE LAPLACE. (ACL) #20.3.76

KNORR, WILBUR R. 1982–1983. Observations on the early history of the CONICS. *Centaurus* 26, 1–24. A continuation of the paper "The hyperbola-construction in the *Conics*, Book II: Ancient variations on a theorem of APOLLONIUS" in *Centaurus* 25 (1982), 253–291. (ACL) #20.3.77

LAKS, A. 1991. Epicure et la théorie aristotélicienne du continu [EPICURUS and the Aristotelian theory of the CONTINUUM]. Pp. 181–194 in #20.3.31. Argues, contrary to the long-held view propounded initially by Ettore Bignone in 1936, that Epicurus' formulation of ATOMISM reflected responses and reactions to ARISTOTLE's criticisms in the *Physics*. The author maintains, in fact, that Epicurus' reading of Aristotle may have been even more perspicuous than the scholarship of the last two decades has suggested. (KVHP) #20.3.78

LAUDAN, RACHEL. 1993. Histories of the sciences and their uses: A review to 1913. *History of Science* 31(1), 1–34. Writing on the history of science began in ancient Greece. This survey of material that has appeared since that time until the early 20th century is undertaken because "these histories afford a valuable resource for ascertaining shifting concepts of science and its uses" and because they "elicit successive and competing senses of scientific progress." Due attention is given to HISTORIES OF MATHEMATICS from Eudemus to Cantor. (TLB) #20.3.79

LAUENER, HENRI. 1992. La philosophie idonéiste [The philosophy of *idonéisme*]. Pp. 15–22 in #20.3.99. A brief discussion of the PHILOSOPHY OF SCIENCE of FERDINAND GONSETH, which exam-

ined questions of scientific practice and which hinged on the idea that scientific knowledge resulted from dialectical processes. (KVHP) #20.3.80

LAWVERE, F. W. 1992. Categories of space and of quantity. Pp. 14–30 in #20.3.34. Lawvere makes fundamental and almost exclusive use of CATEGORY THEORY and a dialectical method to indicate how answers to “many mathematical and philosophical problems ... now seem susceptible of exact solution” PHILOSOPHY OF MATHEMATICS. (ACL) #20.3.81

LOHMAR, DIETER. See #20.3.124.

MAC LANE, S. 1992. The protean character of mathematics. Pp. 1–13 in #20.3.34. The author describes a general, “protean”, property of mathematics, namely that it “applies in more than one empirical context.” PHILOSOPHY OF MATHEMATICS. (ACL) #20.3.82

MAHONEY, MICHAEL S. 1992. Book review. *Isis* 83(3), 466. A book review of *Mathematik im Abendland: Von den römischen Feldmessern bis zu Descartes* by Helmuth Gericke (See #18.4.41.) Continuing the publication of his SURVEY LECTURES ON THE HISTORY OF MATHEMATICS, begun with *Mathematik in Antike und Orient*, Helmuth Gericke moves from surveying in the Roman republic to the creation of symbolic algebra and analytic geometry in 17th-century France. (GB) #20.3.83

MAHONEY, MICHAEL S. 1992. COMPUTERS AND MATHEMATICS: The search for a discipline of computer science. Pp. 349–363 in #20.3.34. “The search for a mathematical structure of computing may involve a new historical and philosophical structure of mathematization.” (ACL) #20.3.84

MALYKH, A. E. 1990. On the solution of various problems in the theory of combinations. *Istoriko-matematicheskie issledovaniya* 32–33, 211–234 [In Russian]. A wide-ranging survey of the history of combinatorial problems, especially as related to combinatorial probability, including work on Latin squares, from Leibniz to recent times, including the work of Cayley and Tait. COMBINATORICS. (IA) #20.3.85

MANTEUFFEL, K., AND BUCHHEIM, R. 1992. Die Rechenmaschine von Johann Philipp Gruson. *Wissenschaftliche Zeitschrift der Technischen Universität “Otto von Guericke” Magdeburg* 36, 102–105. The Magdeburg mathematician JOHANN PHILIPP GRUSON (1768–1857) invented a CALCULATING MACHINE in 1790 based on new mathematical methods that were technically easy to construct. The authors provide an illustration of how the metal disc, with inscribed numerals and accompanying pointer, looked and give examples of its use. One sector of the disc was devoted to addition and subtraction but the more interesting part was made up of sectors containing, in effect, a complete factor table using modular arithmetic. (ACL) #20.3.86

MAOR, ELI. 1991. *To infinity and beyond: A cultural history of the infinite*. Princeton: Princeton Univ. Press. xvi + 284 pp. Paperbound \$16.95. Paperbound edition of a 1987 Birkhäuser monograph. An effusive survey of approaches to INFINITY in mathematics and art. [Adapted with permission from *The American Mathematical Monthly* 100(1) (1993), 94.] (LAS) #20.3.87

McMILLEN, TOM. 1992. Book review. *Isis* 83(4), 666. A review of John Craige’s *Mathematical Principles of Christian Theology* by Richard Nash. The mathematical prestige of JOHN CRAIGE was tarnished by later commentators of his *Theologiae Christianae Principia Mathematica*. Nash argues that Craige deserves better in that he was not ignorant of the new inductivist approach toward PROBABILITY reasoning (Pascal’s Wager); rather he rejected it. CHRISTIAN THEOLOGY. (GB) #20.3.88

MEHRTENS, HERBERT. 1993. The social system of mathematics and national socialism: A survey. Pp. 219–246 in #20.3.113. Examines mathematics as a “social system,” in the sense of LUHMANN, during the NAZI REGIME in Germany. (KVHP) #20.3.89

MEHRTENS, HERBERT. See also #20.3.123.

MINAZZI, FABIO. 1992. La signification et l’importance de l’oeuvre de Gonsseth à la lumière d’une considération critique de la tradition néopositiviste [Meaning and importance of Gonsseth’s work in light

- of criticisms of the neopositivist tradition]. Pp. 137–146 in #20.3.99. Places the work and thought of FERDINAND GONSETH in perspective within the history of EPISTEMOLOGY. (KVHP) #20.3.90
- MONASTYRSKII, M. I. 1990. On the article of H. Weyl, "Riemanns geometrische Ideen, ihre Auswirkung und ihre Verknüpfung mit der Gruppentheorie." *Istoriko-matematicheskie issledovaniya* 32–33, 248–290 [In Russian]. Brief introduction to a paper of HERMANN WEYL (pp. 248–250), together with a Russian translation of the paper (250–288). GEOMETRY. (IA) #20.3.91
- MOREL, BERNARD. 1992. Ferdinand Gonseth. [In French] Pp. 3–6 in #20.3.99. Biographical sketch of FERDINAND GONSETH. (KVHP) #20.3.92
- MORMANN, T. *See* #20.3.71 and #20.3.34.
- MOSTERIN, J. 1992. THEORIES and the flow of INFORMATION. Pp. 367–378 in #20.3.34. The author views mathematical descriptions as an encoding process, and axiomatizations as compressions of information. (ACL) #20.3.93
- NARCOWICH, F. J. *See* #20.3.48.
- NASH, RICHARD. *See* #20.3.88.
- NICHOLSON, JULIA. 1993. The development and understanding of the concept of QUOTIENT GROUP. *Historia Mathematica* 20(1), 68–88. A brief description of the prehistory of the concept of a quotient group in the writings of E. GALOIS and E. BETTI is followed by a detailed analysis of the work of C. JORDAN. After that time the intertwining of quotient groups with abstraction, especially the notion of an equivalence relation, is charted in the writings of R. Dedekind, L. Kronecker, G. Frobenius, G. Cantor, O. Hölder, and G. Frege. (DEZ) #20.3.94
- NIINILUOTO, I. 1992. Reality, truth, and confirmation in mathematics—Reflections on the quasi-empiricist programme. Pp. 60–78 in #20.3.34. Evaluates recent physicalist and quasi-empiricist PHILOSOPHIES OF MATHEMATICS and uses KARL POPPER's World 3 to show how to combine realism and constructivism. (ACL) #20.3.95
- NODDINGS, NEL. 1993. Politicizing the mathematics classroom. Pp. 150–161 in #20.3.113. An argument in favor of the politicization of the mathematics classroom in the sense that students should be engaged in negotiations with their teachers over such matters as workload and evaluation, that feminist themes should be discussed in the context of mathematics, and that educators should ponder not only the cognitive aspects of learning mathematics but also the endeavor's ethical and political sides. The POLITICS of mathematics. (KVHP) #20.3.96
- OTTE, M. 1992. Constructivism and objects of mathematical theory. Pp. 296–313 in #20.3.34. Analyzes the concepts of function and equality in terms of the two contrasting modes of thought, apriorism and empiricism, in early 19th-century mathematics. G. W. F. HEGEL. H. G. GRASSMANN. B. BOLZANO. (ACL) #20.3.97
- PANZA, MARCO. 1992. Gonseth et les prolégomènes d'une logique de la connaissance [Gonseth and the prolegomena to a logic of knowledge]. Pp. 23–45 in #20.3.99. Explores the views of FERDINAND GONSETH on logical positivism before examining eight theses, drawn from Gonseth's writings. The eight theses shed light on the alternative philosophical conceptions Gonseth held as well as on what might be called his logic of knowledge. PHILOSOPHY. (KVHP) #20.3.98
- PANZA, MARCO, AND PONT, JEAN-CLAUDE (Eds.) 1992. *Espace et horizon de réalité: Philosophie mathématique de Ferdinand Gonseth*. Paris: Masson. x + 194 pp. Paperbound. A collection of papers presented at a conference held in Geneva in December, 1990, to celebrate the 100th anniversary of the birth of FERDINAND GONSETH and examining his PHILOSOPHY OF MATHEMATICS. The volume explores the following themes: perspectives on Gonseth's philosophy of science, the problem of space, Gonseth and European philosophy of science, and Gonseth's thought today, in addition to providing some more personal recollections of Gonseth's life. It closes with a bibliography of Gonseth's philo-

sophical works. Articles by Maria Castellana, Alfons Grieder, Gerhard Heinzmann, Henri Lauener, Fabio Minazzi, Bernard Morel, Marco Panza, Jean Petitot, Jean-Claude Pont, Jean-Michel Salanskis, Hourya Sinaceur, and Valerio Tonini are abstracted separately. (KVHP) #20.3.99

PAVLOV, A. M. 1990. The first Russian woman to attain a Magister degree in mathematics. *Is-toriko-matematicheskie issledovaniya* 32–33, 234–247 [In Russian]. LYUBOV NIKOLAEVNA ZAPOLSKAYA (1847–1904) was the first Russian woman to receive a higher degree in mathematics. Her doctoral dissertation solved several problems in GALOIS THEORY concerning extension fields of rational numbers, and she continued to work in field theory. WOMEN IN MATHEMATICS. RUSSIA. (IA) #20.3.100

PEPE, LUIGI. See #20.3.5.

PETITOT, JEAN. 1992. Schématisme, sciences cognitives et physiques mathématique: Hommage à Ferdinand Gonseth [Schematism, cognitive sciences and mathematical physics: An homage to FERDINAND GONSETH]. Pp. 149–176 in #20.3.99. Defines the notion of schematism in the thought of Gonseth and distinguishes between the two types: empirical schematism and transcendental schematism. PHILOSOPHY. (KVHP) #20.3.101

PIEPER, HERBERT. 1993. On Euler's contributions to the four-squares problem. *Historia Mathematica* 20(1), 12–18. The author provides a new interpretation of the work of LEONHARD EULER on the FOUR-SQUARES PROBLEM based on a passage in Euler's notebook 132. The three results needed for the general proof were stated by Euler but the proof eluded him. (DEZ) #20.3.102

PONT, JEAN-CLAUDE. 1992. *La géométrie et le problème de l'espace chez Gonseth* [Geometry and the problem of space in Gonseth]. Pp. 57–66 in #20.3.99. Presents first a sketch of the ideas that FERDINAND GONSETH put forth in his book, *La géométrie et le problème de l'espace*, and then points out some of the shortcomings particularly of Gonseth's notion of intuition. GEOMETRY. SPACE. (KVHP) #20.3.103

PONT, JEAN-CLAUDE. See also #20.3.99.

PUTTE, HELMUT. See #20.3.132.

RAJAGOPALAN, M., ACHAR, B. N. NARAHARI, AND BELLUR, SRINATH. 1993. The man who knew infinity. *Notices of the American Mathematical Society* 40(2), 99–101. Letter-to-the-editor accusing Robert Kanigel of being insulting to Hindus in his book about RAMANUJAN (see #19.2.47.) Kanigel's rebuttal cites "the exquisite danger that lies in wresting isolated statements from their context." See #20.2.73. (DEZ) #20.3.104

RANTALA, V. 1992. Reduction and explanation: Science vs. mathematics. Pp. 47–59 in #20.3.34. Analyzes and compares the role of REDUCTION in PHILOSOPHIES OF MATHEMATICS AND SCIENCE. (ACL) #20.3.105

RASHED, ROSHDI. 1992. *Optiques et mathématiques: Recherches sur l'histoire de la pensée scientifique en arabe*. Brookfield, VT: Variorum/Ashgate Publishing Co. xii + 340 pp. Hardcover. \$94.95. A collection of 15 previously published articles by the author divided into four sections: an introductory study on the problems of transmission of Greek scientific thought into Arabic; six articles on optics, particularly concerning the work of IBN AL-HAYTHAM; five studies on mathematics; and three studies on philosophy of mathematics, centering on the ideas of AL-SIJZĪ and MAIMONIDES, IBN AL-HAYTHAM, and AVICENNA. (KVHP) #20.3.106

RATNER, SIDNEY. 1992. John Dewey, empiricism and experimentalism in the recent philosophy of mathematics. *Journal of the History of Ideas*, 53(3) 467–479. This article examines the parallel between the positions developed by JOHN DEWEY in his *Logic: The theory of inquiry* (1938) and recent exponents of empiricism and experimentalism in the PHILOSOPHY OF MATHEMATICS. Dewey's approach is compared with the more recent quasi-empiricism of LAKATOS and the naturalistic empiricism of KITCHER. (GB) #20.3.107

- RAV, YEHUDA. 1993. Philosophical problems of mathematics in the light of evolutionary EPISTEMOLOGY. Pp. 80–109 in #20.3.113. Advocates the study of the development of mathematics from an evolutionary epistemological point of view. (KVHP) #20.3.108
- RESNIK, M. D. 1992. Applying mathematics and the indispensability argument. Pp. 115–131 in #20.3.34. Argues that antirealists N. Cartwright, H. Kyburg, and H. Field presuppose the same mathematical objects and principles that figure in the Quine–Putnam indispensability argument for the reality of such objects. PHILOSOPHY OF MATHEMATICS. (ACL) #20.3.109
- RESNIK, MICHAEL D. 1993. A naturalized epistemology for a Platonist mathematical ontology. Pp. 39–60 in #20.3.113. Assuming the truth of PLATONISM, the author argues that mathematics arises through the postulation of mathematical objects and suggests that this viewpoint is not at odds with the notion of the preexistence of MATHEMATICAL ENTITIES. (KVHP) #20.3.110
- RESTIVO, SAL. 1993. The promethean task of bringing mathematics to earth. Pp. 3–17 in #20.3.113. Introduction to and summary of the essays contained in #20.3.113. (KVHP) #20.3.111
- RESTIVO, SAL. 1993. The social life of mathematics. Pp. 247–278 in #20.3.113. Argues for a “radically sociological approach” to understanding MATHEMATICAL KNOWLEDGE and its formation. The author claims that SOCIOLOGY has “complete jurisdiction over the problems of the nature of mathematics and mathematical knowledge [p. 15].” (KVHP) #20.3.112
- RESTIVO, SAL, VAN BENDEGEM, JEAN PAUL, AND FISCHER, ROLAND (Eds.) 1993. *Math worlds: Philosophical and social studies of mathematics and mathematics education*. Albany: State Univ. of New York Press. vi + 292 pp. Hardcover \$54.50; paperbound \$17.95. A collection of 13 essays divided into the categories of “Philosophical Perspectives,” “Mathematics, Politics, and Pedagogy,” and “Mathematics, Society, and Social Change.” The essays, by Sal Restivo, Jean Paul Van Bendegem, Michael D. Resnik, Thomas Tymoczko, Yehuda Rav, Roland Fischer, Helga Jungwirth, Nel Nodding, Ole Skovsmose, Philip J. Davis, and Herbert Mehretens, are abstracted separately. (KVHP) #20.3.113
- RICHARDS, JOAN. 1992. Book review. *Isis* 83(2), 328–329. A review of *The development of Newtonian calculus in Britain 1700–1800* by Niccolò Guicciardini (See #17.4.80.) This book presents “a broad overview of 18TH CENTURY ENGLISH MATHEMATICS, but does not materially differ from the Analytic’s assessment of their immediate past” (especially the fluxional calculus). (GB) #20.3.114
- RIDER, ROBIN E. See #20.3.59.
- ROERO, CLARA SILVIA. 1992. Alcune riflessioni sul significato e il ruolo della storia della matematica [Some reflections on the significance and the role of the history of mathematics]. Pp. 85–94 in #20.3.1. Discusses the craft of writing and researching in the history of mathematics and argues for the necessity not only of technical mathematical expertise but also of firm grounding in the history and philosophy of the period under study. HISTORIOGRAPHY. (KVHP) #20.3.115
- SALANSKIS, JEAN-MICHEL. 1992. L’Étrangeté de l’espace: Dialectique ou herméneutique? [The strangeness of space: Dialectic or hermeneutic?] Pp. 83–109 in #20.3.99. Explores the attempts of FERDINAND GONSETH to come to terms philosophically with the notion of SPACE in terms of temporalization as well as his use of dialectical discourse to achieve this end. (KVHP) #20.3.116
- SALANSKIS, JEAN-MICHEL, AND SINACEUR, HOURYA (Eds.) 1992. *Le labyrinthe du continu: Colloque de Cerisy*. Paris: Springer-Verlag France. ix + 452. pp. Paperbound. 188 F. A collection of 34 short essays, most of which were presented at a conference held September 11–20, 1990, at Cerisy dealing with various aspects of the notion of CONTINUITY. The essays are divided into four broad categories: historical insights on the mathematics and philosophy of the continuous, foundational aspects of continuity and infinity, the continuous in scientific contexts, and the theory and practice of nonstandard approaches to the continuous. (KVHP) #20.3.117

- SCHEIBE, E. 1992. The role of mathematics in PHYSICAL SCIENCE. Pp. 141–155 in #20.3.34. The unreasonable effectiveness of mathematics is formulated in terms of the “mathematical overdetermination of physics” and the “nonconservative embedding” of physical theories in mathematics. PHILOSOPHY OF MATHEMATICS. (ACL) #20.3.118
- SCHMIDT, H.-J. 1992. The status of set-theoretic axioms in empirical theories. Pp. 156–167 in #20.3.34. Formulates a distinction between the empirical and the nonempirical part of set theory. PHILOSOPHY OF MATHEMATICS. (ACL) #20.3.119
- SCHUBRING, GERT. 1993. Bernard Bolzano—Not as unknown to his contemporaries as is commonly believed? *Historia Mathematica* 20(1), 45–53. Johann Josef Ignaz (von) HOFFMANN reviewed three pamphlets by BERNARD BOLZANO in the *Jenaische Allgemeine Literatur - Zeitung* in 1821. This article discusses Hoffmann and explores his reading and understanding of Bolzano’s work. (DEZ) #20.3.120
- SHAPIRO, ALAN E. 1992. Beyond the dating game: Watermark clusters and the composition of Newton’s *Opticks*. Pp. 181–227 in #20.3.62. A reconstruction of CHRONOLOGY of the *Opticks* by ISSAC NEWTON using a study of WATERMARKS. Includes a brief description of the formation of watermarks in the process of papermaking. (PLW) #20.3.121
- SHAPIRO, ALAN E. *See also* #20.3.62.
- SHIRONG, GUO. 1993. The Second International Symposium on the History of Mathematics and Mathematical Education in the Regions Using Chinese Characters. *Historia Mathematica* 20(1), 97–98. Report of a meeting held at Huhhot, Inner Mongolia, July 25–30, 1992. (DEZ) #20.3.122
- SIGURDSSON, SKULI. 1992. Book review. *Isis* 83(1), 156–158. A review of *Moderne Sprache Mathematik: Eine Geschichte des Streits um die Grundlagen der Disziplin und des Subjekts formaler Systeme* by Herbert Mehrtens (*See* #18.4.63.) This history of 19th century and 20th century mathematics focuses on a reinterpretation of the so called “crisis” in the FOUNDATIONS of mathematics at the turn of the century. (GB) #20.3.123
- SIGURDSSON, SKULI. 1992. Book review. *Isis* 83(4), 702–703. A review of *Phänomenologie der Mathematik: Elemente einer phänomenologischen Aufklärung der mathematischen Erkenntnis nach Husserl* by Dieter Lohmar. The book consists of two parts: a brief historical account of the structural reorganization of mathematics during the 19TH CENTURY that resulted in formalized, axiomatic mathematics; and a detailed phenomenological study of mathematical knowledge, especially EDMUND HUSSERL’s system. (GB) #20.3.124
- SINACEUR, HOURYA. 1992. La dialectique de l’espace [Dialectic of SPACE.] Pp. 67–82 in #20.3.99. Examines the dialectic of FERDINAND GONSETH on space by examining first his various meanings of “dialectic” and then focusing on his conception of the dialectical “game” as it applies to geometry. For Gonseth, this “game” involved the interaction between various aspects of knowledge, which appear antagonistic when viewed in isolation from one another. PHILOSOPHY. (KVHP) #20.3.125
- SINACEUR, HOURYA. *See also* #20.3.11 and #20.3.117.
- SKOVSMOSE, OLE. 1993. The dialogical nature of reflective knowledge. Pp. 162–181 in #20.3.113. Criticizes the Piagetian emphasis on the individual learner of mathematics in the pedagogical setting and advocates an educational atmosphere of social interaction. EDUCATION. (KVHP) #20.3.126
- SLAVUTSKII, N. SH. 1990. A brief history of investigations of arithmetic properties of Bernoulli numbers (Staudt, Kummer, Voronoi). *Istoriko-matematicheskie issledovaniya* 32–33, 158–181 [In Russian]. An examination of the theorems on numerators and denominators of BERNOULLI NUMBERS, Staudt–Kummer congruence, and Voronoi congruence. (IA) #20.3.127
- SOSSINSKY, A. B. 1993. Russian popular math traditions—Then and now. *Notices of the American Mathematical Society* 40(2), 124–128. Descriptions of the tradition of informally publicizing mathe-

matics in the former SOVIET UNION, including olympiads, mathematical circles, special classes and schools, and publications. The 1960s are regarded as the high point of Soviet mathematics, the period 1968–1986 as one of stagnation. (DEZ) #20.3.128

SOUFFRIN, PIERRE, *See* #20.3.31.

SPARGO, P. E. 1992. Sotheby's, Keynes and Yahuda—The 1936 sale of Newton's manuscripts. Pp. 115–134 in #20.3.62. An account of the 1936 AUCTION by Sotheby's of NEWTON's non-scientific MANUSCRIPTS and of the subsequent attempts by JOHN MAYNARD KEYNES and A. S. YAHUDA to acquire the manuscripts dispersed at the sale. (PLW) #20.3.129

SWERDLOW, NOEL M. 1992. Shadow measurement: The *Sciametria* from Kepler's *Hipparchus*—A translation with commentary. Pp. 19–70 in #20.3.62. A translation with introduction and commentary of KEPLER's *Sciametria*, a section of his *Hipparchus* treating relations between the apparent diameters of the sun and moon and the apparent diameters of the shadows of the moon and earth with these quantities' application to eclipses. ASTRONOMY. (PLW) #20.3.130

TEE, G. J. 1992. Twenty five years of New Zealand mathematics colloquia. *New Zealand Journal of Mathematics* 21, 145–160. The first NEW ZEALAND Mathematics Colloquium was held in 1966 at Victoria University of Wellington. This is essentially a listing of the organizers, venues, principal speakers, visitors (such as Vaughan Jones and Saunders Mac Lane), abstracts, and reports associated with the meetings through 1991. The Colloquium "has continued to exist ephemerally." Photographs show Henry Forder, John Butcher, and others in attendance. (ACL) #20.3.131

TERRALL, MARY. 1992. Book review. *Isis* 83(1), 140–141. A review of *Das Prinzip der Kleinsten Wirkung und die Kraftkonzeptionen der Rationalen Mechanik: Ein Untersuchung zur Grundlegungsproblematik bei Leonhard Euler, Pierre Louis Moreau de Maupertuis und Joseph Louis Lagrange* by Helmut Pulte. The bulk of the book presents details of the mathematical and metaphysical development of the PRINCIPLE OF LEAST ACTION from Manupertuis to Euler to Lagrange. (GB) #20.3.132

THIELE, RÜDIGER. 1993. A French officer in Prussian Magdeburg. *The Mathematical Intelligencer* 15(1), 53–57. The French mathematician and republican patriot, LAZARE CARNOT, spent his last years in exile in MAGDEBURG. Sites in that city associated with him are described and his life is briefly reviewed. (TLB) #20.3.133

THIJSEN, J. M. M. H. 1992. David Hume and John Keill and the structure of continua. *Journal of the History of Ideas*, 53(2), 271–286. A comparison of the views of DAVID HUME and JOHN KEILL on CONTINUITY. Keill argues that the divisibility of a magnitude can be demonstrated by geometrical arguments. In contrast, Hume maintains that an extension can be resolved into indivisible parts, but that these are neither mathematical points nor physical points. This comparison helps explain Hume's motivation for defending indivisibility. (GB) #20.3.134

TONINI, VALERIO. 1992. Les entretiens romains [The Roman conversations]. Pp. 7–11 in #20.3.99. A recollection of two series of discussions held in Rome—one in December 1954, the other one year later—on what TONINI and FERDINAND GONSETH termed "open philosophy." The author recalls the content particularly of the first of these discussions. PHILOSOPHY. (KVHP) #20.3.135

TOTI RIGATELLI, LAURA. 1992. L'Algebra in Italia nel tre–quattrocento [Algebra in ITALY in the 14th and 15th centuries]. Pp. 41–52 in #20.3.1. A brief survey of the 14th- and 15th-century mathematical codices of particular interest and importance in the history of ALGEBRA. (KVHP) #20.3.136

TYMOCZKO, THOMAS. 1993. Mathematical skepticism: Are we brains in a countable vat? Pp. 61–79 in #20.3.113. The author views 20th-century SET THEORY as MATHEMATICAL PRACTICE—as opposed to a foundational program—to support his claim that the PHILOSOPHY OF MATHEMATICS should focus more tightly on the issue of mathematical practice. (KVHP) #20.3.137

VAN BENDEGEM, JEAN PAUL. 1993. Foundations of mathematics or mathematical practice: Is one forced to choose? Pp. 21–38 in #20.3.113. Contends that mathematics should be studied and under-

- stood not in Platonic terms but in light of a theory or model of MATHEMATICAL PRACTICE. FOUNDATIONS. (KVHP) #20.3.138
- WARDY, ROBERT. 1991. Le jeu des nombres aristotélicien [Aristotle's number play]. Pp. 121–150 in #20.3.31. Focuses on the fifth chapter of Book 7 of ARISTOTLE's *Physics* and, through a close more contextual analysis, points to serious shortcomings in various Whiggish interpretations which tend to view Aristotle's work here as the beginning of MATHEMATICAL PHYSICS. (KVHP) #20.3.139
- WASCHKIES, HANS-JOACHIM. 1991. Mathematical continuum and continuity of movement. Pp. 151–180 in #20.3.31. A close examination of the theory of the CONTINUUM that ARISTOTLE put forth in Book 6 of the *Physics* in which the author argues that, prior to Aristotle, the conception of a continuum involved only extended magnitudes in space. With Aristotle, however, the notion of a continuum was extended to time and process. (KVHP) #20.3.140
- WATERHOUSE, WILLIAM, C. 1993. Harmonic means and Diophantus I.39. *Historia Mathematica* 20(1), 89–91. Comments on a scholium about HARMONIC MEANS in the *Arithmetica* of DIOPHANTUS. (DEZ) #20.3.141
- WHITMAN, BETSEY S. 1993. An American woman in Göttingen. *The Mathematical Intelligencer* 15(1), 60–62. A brief report on MARY FRANCES WINSTON, concentrating on her time in Göttingen where she was a student of Felix Klein's and "the first American woman to earn a Ph.D. in mathematics from a European university." (TLB) #20.3.142
- WILSON, CURTIS. 1992. Euler on action-at-a-distance and fundamental equations in continuum mechanics. Pp. 399–420 in #20.3.62. An examination of the association between the METAPHYSICS of LEONHARD EULER and his equations on CONTINUUM MECHANICS. The author surveys Euler's theories of fire, light and color, magnetism, and gravity and his attempts to provide a metaphysical foundation for mechanics. (PLW) #20.3.143
- WILSON, ROBIN. 1993. Greek Mathematics III—Archimedes. *The Mathematical Intelligencer* 15(1), 76, ARCHIMEDES' contributions are quickly reviewed and commemorative stamps from several countries are shown. (TLB) #20.3.144