



International Study Group On the Relations Between
HISTORY and PEDAGOGY of MATHEMATICS

NEWSLETTER

AN AFFILIATE OF THE INTERNATIONAL COMMISSION ON MATHEMATICAL INSTRUCTION

No. 16

May 1988

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The *Newsletter* is the communication of the International Study Group On the Relations Between History and Pedagogy of Mathematics, an affiliate of the International Commission on Mathematical Instruction. Edited and produced in the Dept of Mathematical Sciences, Ball State Univ, Muncie, Ind. 47306 U.S.A. The *Newsletter* is available free of charge upon request. Distributors: U.S., Editorial Office; Canada, David Wheeler (Concordia Univ, Montréal, Qué H4B 1R6); Mexico, Alejandro Garciadiego (UNAM-contact at: José M. Velasco 71, Del. Benito Juárez 03900, Mexico, D.F.); South America, Ubiratan D'Ambrosio (address above); Australia, George Booker (Brisbane Coll Adv Educ, 130 Victoria Park Rd, Kelvin Grove, Queensland 4059); New Zealand, Andy Begg (Math Curr Off, Dept Educ, Private Bag, Wellington); elsewhere, Edw. Jacobsen (Div Sci Tech & Envrmtl Educ, UNESCO, B.P. 3.07 Paris). Send requests and address changes to the Editor.

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Calendar

Meetings with HPM components are highlighted.

1988 June 30-July 4. São Paulo
HPM Americas Section in conjunction with 2.o
Congresso Latinoamericano de História da
Ciência e Tecnologia. Contact: Comissão
Organizadora, 2.o CLA/HCT, Caixa Postal 6063,
13.081 Campinas SP Brasil [See inside.]

1988 July 20-22 Firenze
HPM Quadrennial Session Prior to the
International Congress on Mathematical
Education (ICME). Contact: Dr Florence Fasanelli,
National Science Foundation, 1800 G Street NW,
Washington, DC 20550 [See inside for details]

1988 July 27-Aug 3 Budapest
International Congress on Mathematics
Education (ICME 6). Contact: ICM-6, János Bolyai
Mathematical Society, H-1061 Budapest, Anker
köz 1-3, Hungary. [See No 13, 14 and inside]

1988 Sept 1-3 Leicester
British Society for the History of Mathematics.
Contact: Dr Colin R. Fletcher, Dept Math, University
College of Wales, Aberystwyth, U.K. [See inside for
details.]

1988 Nov 14-19. Hannover
Fifth Internationaler Leibniz-Kongress: "Leibniz-
Tradition und Aktualität". Contact: Kongressbüro,
Niedersächsische Landesbibliothek, Waterloostr. 8, D-
3000, Hannover, 1, FRG.

1989 Jan 10-14. Phoenix
Annual Meetings of American Mathematical Society and
Mathematical Association of America. Contact: AMS,
P.O. Box 4887, Providence, Rhode Island USA.

1989 Apr 11-15 Orlando
Annual Meeting of the National Council of
Teachers of Mathematics, and the Americas
Section of HPM.

1989 Aug 1-9 Hamburg & Munich
14th International Congress on the History of Science.
Contact: ICHS Congress 1989, CPO HANSER SERVICE,
Postfach 1221, D-2000 Hamburg-Barbüttel, FRG
Telephone: (40) 670 60 511; telefax (40) 670 32 83;
Telex: 2 145 737 cpod.

From the Editor—

A Time To Change

This is the 16th issue of the HPM *Newsletter*, counting from the February 1980 Newsletter edited by Leo Rogers. The first issue contained a very good bibliographic survey of sources for history and teaching. It was followed by what *ex post facto* has been called the second and third newsletters, "ISGHPM Newsletter (North American Edition)", edited by Bruce E. Meserve and dated February 1982 and October 1982. The present editor began with the May 1983 issue (the 4th), taking advantage of computers, word processing and computer mailing lists. The October 1983 issue was the first actually to carry a number: "No. 4." Beginning with issue No. 7, the *Newsletter* became the organ for the International Study Group for the Relations Between History and Pedagogy of Mathematics (HPM), not just the North American ISGHPM. The HPM mailing list has grown to around 2500 with readers on every continent, except Antarctica, and in 62 countries. (The total number is approximate, since the mailings are made from several points around the world.)

Beginning with the first issue, the *Newsletter* has been increasing in size and expanding its mailing list. In order to distribute the *Newsletter* gratis, several individuals have provided their time and several institutions their resources. Each editor has typed, surveyed journals, corresponded, duplicated, folded and stapled, applied labels, and a variety of other tasks. This is important work as many of you have made known: you have commented that you read and appreciate

receiving the *Newsletter*.

It is time for a change. A new editor will bring new ideas and enthusiasm, and both the *Newsletter* and the HPM organization would be beneficiaries. For my part, it is time that I devote more energies to other pursuits in history and the teaching of mathematics. Therefore, with this issue I wish to announce my intention of stepping down from the editorship of the HPM *Newsletter* and to start the process of finding a new editor.

Concomitantly, this will require modifying the newsletter distribution system. However, I firmly believe that it is important to establish and maintain a network for all of us who are interested in using history in teaching mathematics. So, I will continue as editor for a reasonable time until a new editing arrangement can be found.

HPM is a very loose organization. It depends on individuals stepping forward and giving their time to keep it functioning. This *Newsletter* depends on that as well. If you have an interest in producing a newsletter, or know of someone else who is, please let me know. It does not matter that you think that you are not in the "mainstream" of HPM activity; there is no mainstream or central organization, in spite of appearances. Whoever is willing to do work will be given opportunities. Moreover, there is room for several people on the *Newsletter*, and I would recommend that the tasks be divided among several individuals so that the growth and expansion can be carried on.

Preparations are being made now for a transition. This issue of the *Newsletter* has a great many more bibliographic entries, reflecting my effort to get caught up on recent journals. (This bibliographic work is most important and is in need of assistance.) In addition, the mailing list is being converted to a data base that will operate on an IBM-type computer with MS-DOS operating system (it currently is on Apple computer files).

I would hope that future issues of the *Newsletter* could take advantage of improved technology: for example, producing it with TeX and a laser printer. Regardless of the means of production, however, the *Newsletter* should

continue; for many people, it is their only way to keep in touch with developments in the field.

I should like, on behalf of all of us in HPM, to note our gratitude to the several individuals who assist in producing and distributing the *Newsletter*. The distributors are listed on the first page; if you have not done so before, I encourage you to write a note of gratitude to your distributor for his services. A special debt is owed to the Department of Mathematical Sciences of Ball State University and to its chairman, Dr Donald R. Whitaker. The department provides the equipment on which the *Newsletter* is produced, plus the postage for mailing to over 1500 U.S. recipients and to several individuals in other countries, who then reproduce and mail the *Newsletter* in their respective regions. There are a variety of incidental costs in producing a newsletter and the department has provided for these, too.

The quality of the *Newsletter* is directly dependent on the quality of material which I receive for inclusion. The response has been very good, but I encourage you to send information you may have about meetings and conferences, books, theses and articles which are appropriate for our readership. This issue has several reports supplied by individuals who work hard to make conferences a success. Many thanks to them for doing the extra work of supplying the reports for the rest of us.

I am grateful for the opportunity to have served as editor. During the years, Bruce Meserve (who asked me to take over the editing) was especially supportive and I wish to acknowledge my debt to him. Being editor has provided me with many new acquaintances through correspondences and at meetings. I look forward to these contacts continuing in the future. Most importantly, I wish to express my thanks to those of you who have told me how important the *Newsletter* is to your work and professional interests: yours has been the sustaining support. □

N.B. New electronic mail address for the editor: on BitNet, use CVJONES@BSUVAX1 (the previous CSNET address is no longer operative).

Leibniz Congress November 1988

The Gottfried Wilhelm Leibniz Society is holding a Congress November 14-19, 1988. The Congress will explore the question of the historical position of Leibniz's thought and of its importance today. Sections will discuss the following themes: Leibniz's relationship to the past, to the history of philosophy and the sciences, Leibniz and his contemporaries (the debate concerning "ancient" and "modern"), Leibniz's standing in the scholarship of his time, contemporary reception and resistance, followers and opponents, Leibniz's presence in contemporary philosophy and science.

The Congress will be held in the Congress Centre, Hanover (the Stadthalle). Enquiries should be sent to the Kongressbüro, Niedersächsische Landesbibliothek, Waterloostr. 8, D-3000 Hannover 1.

[Information from the Congress announcement.] □

XVIIIth International Congress on the History of Science

The XVIIIth International Congress on the History of Science will take place in Hamburg and Munich on August 1-9, 1989. The theme for the Congress is "Science and Political Order," which is to embrace all aspects of the historical relationships between science (including technology and medicine) and the manifestations of secular and nonsecular power in all its various forms - political, ecclesiastical, and juridical.

The first circular for the Congress is now being distributed by the National Commissions and Societies for the History of Science and Technology. For a copy of the circular, please write to Professor C. J. Scriba, Institut für Geschichte der Naturwissenschaften, Mathematik und Technik, Universität Hamburg, Bundesstraße 55, 2000 Hamburg 13, F.R. of Germany. Return the reply card to receive the Second Circular, to be mailed in the Fall of 1988.

[From the press release and first circular.] □

"History in Mathematics Education Workshop" Proceedings Published

The proceedings of the "History in Mathematics Education Workshop," held at the University of Toronto in July-August 1983,

recently have been published by Belin in Paris as No. 21 in the series, "Cahiers d'histoire et de philosophie des sciences." The conference, organized by Christoph J. Scriba, was sponsored by the International Commission on the History of Mathematics and the Institute for the History and Philosophy of Science and Technology of the University of Toronto. The publication of the Proceedings was facilitated by Jean Dhombres, President of the Société française d'histoire des sciences et des techniques.

This publication contains a variety of good resources for using history in the mathematics classroom. The papers range from the practical to the theoretical, and chronologically cover mathematics from antiquity to the nineteenth century. Edited by Ivor Grattan-Guinness and entitled *History in Mathematics Education*, the contributions are divided into four parts. Part One, Themes in Ancient Mathematics: "Mathematical methods in ancient science: spherics" by J.L. Berggren; "Mathematical methods in ancient science: astronomy" by J.L. Berggren. Part Two, From Ancient to Modern Mathematics: "Euclid Book V from Eudoxus to Dedekind" by Stillman Drake; "Mathematical proof: origins and development" by Barnabus B. Hughes; "On the so-called 'classical problems' in the history of mathematics" by Christoph J. Scriba. Part Three, Themes from the Eighteenth and Nineteenth Centuries: "Uses of history in teaching number theory" by Christoph J. Scriba; "What was and what should be the calculus?" by I. Grattan-Guinness; "British abstract algebra: development and early reception" by Helena Pycior. Part Four, Aspects of History in Mathematics Education: "Biography in the mathematics classroom" by Helena Pycior; "Transparencies in the history of mathematics" by Barnabus B. Hughes; "History of mathematics and mathematical education: a suggested bibliography" by Abraham Arcavi.

Orders may be sent directly to the publisher: Belin, 8 rue Férou, 75006 Paris, France; the cost is 60 Ffr plus postage. Residents of North and South America and the Pacific should find it easier to send a check for \$20 (US) along with a complete mailing address to Christoph J. Scriba, Bundesstr. 55, IGN, D-2000

Hamburg 13, Federal Republic of Germany. Upon receipt, the order will be transmitted to the U.S. by electronic mail, and the book shipped from New York.

[Based in part on information provided by C.J. Scriba.] □

Fourteenth Annual Meeting of CSHPM

The Canadian Society for History and Philosophy of Mathematics (CSHPM) held its Fourteenth Annual Meeting, 1988 May 28-29, at the University of Windsor, Windsor, Ontario, Canada. The next meeting of the organization is planned for late May (or early June) 1989 at Laval University in Québec City.

For information about the Canadian Society or about its next meeting, contact the Society's *Bulletin* editor, Roger Herz-Fischler, Department of Mathematics and Statistics, Carleton University, Ottawa, Ontario K1S 5B6, Canada (by electronic mail via the NetNorth computer network, at ROGERH-F@CARLETON). □

History of British Mathematics Course Offered at Oxford

[Paul Wolfson —] This summer, the course "On the Shoulders of Giants: A History of British Mathematics" will again be offered at Oxford University. Lectures, aimed at a general audience, will cover the lives and contributions of some giants of British mathematics, taking a broad view of the scientific and cultural contexts of their achievements. A few lectures will draw on a background in the calculus. To supplement the lectures, visits are planned to some places where these men and women lived and worked. Three undergraduate or graduate credits are available for completing this three week course, August 1-20. (Professionals in the U.S. may find their expenses to be tax deductible.)

This course is part of the 1988 summer program at Oxford University sponsored by International University Partnerships of The Center for International Studies, Indiana University of Pennsylvania. Its program is designed to provide an opportunity to study at England's oldest university, founded in 1167. Classes, as well as room and board, will be scheduled at Ruskin, one of Oxford's colleges. Room, board, and one-day trips in conjunction

with the course are all covered by the program fee of \$750. Tuition (\$228 per 3-credit undergraduate and \$306 per 3-credit graduate course), airfare, and weekend meals are not included. For further information, write to the instructor: Professor Paul Wolfson, Department of Mathematical Sciences, West Chester University, West Chester, PA 19383.

[Paul Wolfson is the course organizer.]

Philosophia Mathematica Presents Two Series

Philosophia Mathematica is a journal focusing on the philosophy of modern mathematics. It provides "an international forum for the studies in the nature of mathematics and the works of mathematicians (exemplified by E.T. Bell's *Men of Mathematics*, 1937, or D.A. Albers-J.L. Alexanderson's *Mathematical People*, 1985) in the light of philosophy—in the original sense of *scientia scientiarum*, relative to history, sociology, psychology, politics, etc.—for the most comprehensive perspective."

Some sample articles from Series I (1964-1981) of *Phil Math* are: "A Reflection on Foundations of Mathematics—Mathematicians Regarded as Biological Specimens," by W.W. Sawyer; "Pure Mathematics in France from 1949 to 1955" and "L'école Française Moderne des Mathématiques," both by J. Dieudonné; "Mathematics in Wittgenstein's *Tractatus*," by G.K. Plochman; "On Gödel's Philosophy of Mathematics," by S. Silvers; "The Affiliation of Contemporary Mathematics with Indian and Chinese Ideas," by D.B. Richardson; a translation of "Axiomatic Thinking," by D. Hilbert; and a translation of "On the Concept of Number: Psychological Analysis," by E. Husserl. Also included in Series I are special issues on Women in Mathematics and The Psychology of Mathematics.

From Series II (1986-) of *Phil Math*, a sample article is "Mathematical Logic is Neither Foundation Nor Philosophy," by S. MacLane. There is also a special issue on Soviet Philosophy of Mathematics Today, forthcoming.

For subscription, correspondence, etc. concerning the *Philosophia Mathematica*, write to: Professor J. Fang, O.D.U. (Phil. Dept.), Norfolk, Va 23508, USA. The current rate for

Series II is \$15 (\$8 for individuals) for volume one, and \$25 (\$12) for volume two. Some back issues of Series I are still available at reduced rates.

[From information provided by Dr Irving Anellis, Assistant Editor and Member of the Editorial Board.]

Two Questionnaires On Mathematical Creativity

A study of creative work in the field of mathematics is being conducted by Dr. Voitsekhovich V., Dept. of Materialistic Dialectic, Institute of Philosophy, AS of the USSR Volkhonka 14, Moscow 119842, USSR. A "Questionnaire on the Psychology, Methodology, and Philosophy of Creative Work in the Field of Mathematics" has been designed, and the answers from it will be used to help test a number of hypotheses related to the process of mathematical research. The results of the survey will contribute to better understanding of the creative processes in mathematics. The questionnaire from the book *Essai sur la Psychologie de L'Invention dans le Domaine Mathématique* by I. Hadamard was consulted in preparing the present questionnaire.

The questions pertaining to the psychology of mathematicians' work discuss style of work, mathematics in dreams, emotions and feelings, influence of stimulants or tranquilizers on performance, and language base. The questions on methodology discuss spontaneity or purposefulness, general or specific solving, results under unusual circumstances, and creative thinking from interest in art. The philosophical questions pertain to sources of new ideas, developmental promotion by new theories, principal limitations, and mathematical trends.

If you would like to participate in the questionnaire, please write to: Dr. Irving H. Anellis, 110 McDonald Drive, #B-B, Ames, IA 50010-3470, U.S.A., for a copy of the questionnaire.

A questionnaire on the same general area is in *The Mathematical Intelligencer* 10:1 (Winter 1988) 33-37. In a cover article, "The psychology of mathematical creativity", Allan Muir describes some of the reasons for attempting another questionnaire closely

modelled on Hadamard's. The questionnaire itself is included with directions on how to participate. □

Final Program For ICME-6

The Final program for ICME-6, which will take place July 27-August 3, 1988 in Budapest, Hungary, has been prepared. The four sessions are arranged in two symposia, one panel discussion, and a session of contributed papers. One symposium is "Non Euclidean Geometries and Their Adoption in the School System," with speakers Nikos Kastanis (Greece), Massouma Kazim (Qatar) and Tibor Wessely (Romania). The second symposium is "The Evolution of Algorithms for Use in Schools," with Lawrence Shirley (Nigeria) and two more speakers (to be announced). The panel theme is "History of Mathematics in the Teaching of Mathematics," with panelists Evelyne Barbin (France), Hans Wössing (German D.R.), Helena Pycior (U.S.A.), and Árpád Szabó (Hungary), and moderator Luis Carlos Arboleda (Colombia). The communications have yet to be organized.

The symposia, which should stress history as relevant to mathematical education rather than history of mathematics per se, are divided into 20 minutes for each speaker, including introduction and questions. Each panelist will have 10 minutes for presentation, and 20 minutes left for an overall discussion. □

HPM Session Preceding ICME-6 in Florence

A satellite meeting for the International Study Group on History and Pedagogy of Mathematics (HPM) will take place in Florence, Italy, the week preceding ICME-6 in Budapest. The meeting, which is 1988 June 20-22, will be at the Palazzo Medici-Riccardi (1 Via Cavour) in Florence, Italy.

A tour of the Palazzo Castellani con Museo di Storia della Scienza-Museum of the History of Science (Piazza dei Giudici 1) and a trip to Vinci is planned. Participants will be responsible for arranging their own local housing. The meeting location is very close to the railroad station.

For more information, contact: Dr. Florence D. Fasanelli, National Science Foundation, 1800 G St, N/W, 4th Floor, Washington, D.C. 29550, U.S.A. □

History of Arabic Mathematics Colloquium

The History of Arabic Mathematics group in collaboration with the Association of Tunisian Sciences and Mathematics are having an international colloquium on the history of Arabic mathematics at Tunis, 1988 December 3. The colloquium is a continuation of the first colloquium that took place in 1986 in Algeria.

Communications can be presented in one of three languages: Arabic, French, or English. The text is presented in French or English with an accompanying résumé in Arabic.

For more information, write to: Ms. Mahdi Abdeljaouad, I.S.E.F.C., 43 Rue de la Liberté, 2019-Le Bardo, or call (01) 261.329. □

UNESCO Publications

The United Nations Educational, Scientific, and Cultural Organization (UNESCO) publishes a series, *Studies in Mathematics Education*, edited by Robert Morris, which contain articles of interest to mathematics educators, and some deal with aspects of history in teaching. Volume 1 is concerned with seven national programmes for improving mathematics teaching (Hungary, Indonesia, Japan, the Philippines, the USSR, the United Kingdom, and the United Republic of Tanzania). Volume 2 addresses the question, "Does the teaching of mathematics correspond to the needs of the majority of pupils and the society?" Volume 3 is entitled "The mathematical education of primary-school teachers"; Volume 4, "The education of secondary school teachers of mathematics"; Volume 5, "Teaching of geometry"; Volume 6, "Out-of-school mathematics". The Division of Science, Technical, and Environmental Education also publishes other studies; for example, "Science and Mathematics Education in the General Secondary School in the Soviet Union" with a supplement, "Innovations in Science and Mathematics Education in Schools in the Soviet Union", in which the mathematics description is written by HPM Advisory Board member, S.I.

Demidova.

For more information about the series and other publications, contact Dr Ed Jacobsen, Programme Specialist Mathematics Education, Division of Science, Technical and Environmental Education, UNESCO, 7, place de Fontenoy, 75700 Paris. □

**A Short Book Review—
The History of Mathematics: A Reader**

The History of Mathematics: A Reader
Edited by John Fauvel and Jeremy Gray.
London: The Macmillan Press Ltd., in
conjunction with The Open University
(Walton Hall, Milton Keynes MK7 6AA,
England). In the United States, the book is
distributed by Sheridan House, Inc., 145
Palisade Street, Dobbs Ferry, NY 10522.

The History of Mathematics: A Reader is a source book spanning the history of mathematics with some novel features. The editors, John Fauvel and Jeremy Gray (both Lecturers in Mathematics at the Open University), have included a selection of the standard primary sources along with new ones, many translated by "J.J. Gray" (who I assume is one of the editors). However, they have also included selections from many secondary sources. For example, excerpts are taken from Karl Menninger's *Number Words and Number Symbols*, from Aaboe's *Episodes from the Early History of Mathematics*, from H.J.M. Bos' "On the representation of curves in Descartes' *Géométrie*", from Judith Grabiner's *The Origins of Cauchy's Rigorous Calculus*. They have also included journal articles from the debate on the use of "geometric algebra", on the use of computers in solving the four color problem, among others. As a result, this book provides the basis for a genuine readings course in history that puts many of the pertinent sources at the students' fingertips.

The book is designed to be part of the Open University's course on the history of mathematics, and this quite reasonably has dictated the form and content. There are other materials available to the Open University students that no doubt help in interpreting the readings. This may account for many of the excerpts being perhaps a bit

too short as they appear in this book, isolated from the other materials. These other support materials presumably would also make it easier to incorporate the readings from such sources as García Márquez's *One Hundred Years of Solitude* and Alexander Pope's *Epitaph and An Essay on Man*, Epistle II, which are also included. Even so, this collection makes it possible for students to easily read the masters (including some non-mathematics masters) and, in several instances, get the best of scholarly research to help place developments in proper context.

Even with this variety and range of readings, it may not satisfy every demand that one might have for a source book. For example, I would have wanted Zeno's paradoxes, the priority debate on the invention of the calculus, something on the modern paradoxes—none of which are here. This is not legitimate criticism, though: it simply reflects different needs for a history of mathematics course. For those who want to use readings, this book goes beyond what is available in other books with its intermingling of primary sources and secondary interpretations. I think it provides material that will generate good historical discussions in a class, as well as stimulate further reading and research. This makes it a very good addition to the expanding literature on the history of mathematics.
(Reviewed by the Editor.) □

**Spanish Society Proceedings Contain
History of Mathematics**

Estudios sobre Historia de la Ciencia y de la Técnica contain papers from the IV Congress of the Spanish Society of the History of Science and Technology (IV Congreso de la Sociedad Española de Historia de las Ciencias y de las Técnicas), held in Valladolid, 22-27 September 1986. The topics cover science and technology, which includes mathematics, medicine, sociology, expeditions, and archival studies. Some of the titles with reference to mathematics (with authors) are: R. Taton, "La Renaissance et le renouveau mathématique du XVII^e siècle"; J Pérez Laraudogoitia, "P. Fermat o el Paradigma de los principios variacionales"; N. García Tapia, "La formación de los ingenieros españoles antes de la fundación de la Academia de

Matemáticas en 1582"; L. Vega Reñón, "El 'More geometrico' del XVII y el desarrollo de la idea de demostración"; V. Arenzana Hernández, "Dos autores de libros de texto de matemáticas en el siglo XVII: Jacquier y Bezout"; R. Codina Pascual & P. López Cuesta, "La pérdida de la intuición en matemáticas: Sus orígenes griegos"; A. Bernalte Miralles & J. Lombart Palet & J. Viñas, "Introducción de las geometrías non-euclídeas en España"; M.A. Velamazán Gimeno & F. Vea Muniesa, "La enseñanza de las matemáticas en el siglo XIX: Un estudio comparado de textos"; Ll. Garrigós & F. Ferrando & R. Miralles, "Avaluació històrica dels mètodes d'ajust d'equacions químiques".

There are two volumes in the *Studies*, 1118 pages with figures, and published in 1988. It can be ordered from Portico Librerías, S.A., P.O. - Box 503/Pl.S. Francisco, 17, 50080 Zaragoza, Spain. The price is 3,302 Pesetas.

[From a Portico Librerías catalogue.] □

ICMI Issues Study Paper On the Popularization of Mathematics

ICMI Bulletin No. 24 of the International Commission on Mathematical Instruction (June 1988) contains a study paper, "ICMI Study No. 4: The Popularization of Mathematics", by A.G. Howson, J.-P. Kahane, and H. Pollak. The paper is too long to include in its entirety in this *Newsletter* but portions are included verbatim; viz., the two introductory paragraphs and the paragraphs dealing with history (which is closely identified with culture).

"Unlike other sciences, mathematics, or at least some parts of it, is taught to all school-children; it is this which makes mathematics teaching and mathematics education so important. On the other hand there are few, if any, sciences which arouse such negative reactions or are as badly understood as mathematics. Most people, for example, would not even consider mathematics to be a living science. This study will be concerned with the public image of mathematics and mathematicians. It will seek to identify specific needs and to suggest ways in which mathematics can be more effectively popularized. Some of these needs and ways are not particular to mathematics; they also

concern the popularization of any individual science, or of sciences in general. However, the popularization of mathematics has special features: obstacles, constraints and difficulties on the one hand, important possibilities and opportunities on the other. The present situation and record of past achievements differ from country to country and there is a need for international discussion in order to compare experiences, to clarify issues, and to promote further reflections and actions. This study, then, marks an important step forward, for it is intended that there should be a major gathering of those interested (in Leeds, England from 17-22 September, 1989) and that this should be accompanied by a nationally-organised, yet international, 'event' comprising a major exhibition, films, videos and lectures.

"The Leeds meeting, therefore, has two aspects: a national event and an international study. Each aspect will benefit from the other and the planning of the two will be closely coordinated. The present discussion document is the first contribution to the international study. We hope that, like discussion documents issued in connection with previous ICMI studies, it will stimulate written contributions from all over the world. Such contributions, together with the present document, will form the basis for reports and discussion in Leeds. The resulting *Proceedings* of the meeting will then be published as ICMI Study 5.

1. A general framework: needs and methods for the popularization of science.

"No topic should be excluded *a priori*. Whenever there is a real advance in science it has to be known outside the small circle of specialists which participated in that advance—or it risks becoming lost. Any effort to make it known, to explain its meaning to a wider audience, is part of the process of popularization which can take place at a number of levels. At the highest level, the dissemination of advanced topics (through, say, expository papers) is an extreme, but as essential, stage in the general process. Yet there are many other topics of interest apart from contemporary research: for example, the

history of a subject, its applications (particularly any of a novel character) and an understanding of the type of people involved in that science and of their motivation.

2. Special features of the popularization of mathematics

(b) Historical and cultural links

"No other science can boast such a history nor can exhibit so many cultural links. For example, ICMI Study 1 (*The influence of computers and informatics on mathematics and its teaching*) showed how these historical links can be reinforced by the use of computers, for under their influence many parts of mathematics have come to life again after a long period of lying dormant. To trace the history of a topic may be an easy and useful approach to popularization at every level. Alternatively, to see how the same demands in different societies have led to similar, even if superficially different, mathematical ideas can show the extent to which mathematics is culturally based.

"The links with history and culture are not always used as they might be. There are vast mines to explore. The history of mathematics is beginning to be treated as part of general human history and references now appear in books or collections. Greater emphasis is being placed on the study of mathematics in different societies and cultures. How can this new knowledge be exploited? Are there good examples of popularization which can be described and commented upon? In what ways can the multicultural aspects of mathematics be used as a stimulus for its study? As we have written above, new technologies provided new stimulation and new tools. Computer graphics have enabled new and advanced mathematics to be introduced to vast numbers of people: think of the interest aroused because of the great beauty of the graphics associated with Julia and Mandelbrot sets. A new range of mathematical activities can also be introduced through the computer. How can the micro best be used in the popularization of mathematics? What software exists for this

purpose? How effectively does it involve the user in mathematics, rather than, say, in art?

Call for papers

"We hope that readers of this discussion document will respond to it by writing papers on specific themes or questions. These will be welcomed both from those who cannot participate in the closed international seminar and from those who would like an invitation (the number of which will be limited) to do so. Papers should be submitted *no later than* 30 April 1989. Copies should be sent to Professor A.G. Howson, Faculty of Mathematical Studies, University of Southampton, Southampton SO9 5NH, ENGLAND, and Professor J-P Kahane, Mathématique, Bâtiment 425, Université de Paris-Sud, Centre d'Orsay Cédex, FRANCE."

If you would like a complete copy of this discussion paper, contact your national ICMI representative. However, most readers do not know who their national representatives are; in such cases, contact the *Newsletter* editor. (*Newsletter* No. 15 contained a list of members of the ICMI Executive Board, one of whom may be from your country.)

More Details On ICME 6

The "5th Day Special" of ICME 6 is entitled "Mathematics, Education, and Society (MES)". Christine Keitel has provided an extended description of the planned program in *ICMI Bulletin* No. 24. The following is excerpted from this description.

"The special program of the 5th day is novel in ICME congresses. Usually the main task of the scientific community concerned with mathematics education is to support the teaching and learning going on in the schools. However, increasingly the interrelation between mathematics education and educational policies has become a matter of worldwide consciousness and it is evident now that mathematics education has a serious political dimension. The special program of the day therefore addresses the main social and political issues surrounding mathematics education. The program is organized in four

timeslots: 1) Mathematics Education and Culture; 2) Society and Institutionalized Mathematics Education; 3) Educational Institutions and the Individual Learner; 4) Mathematics Education in the Global Village.

"In timeslot 1 general presentations on the central themes of the day will open the special program; in timeslots 2) and 3) we will have panel presentations and discussions on specific topics; and in timeslot 4) there will be five hearings on the main questions society can ask of the international mathematics education community.

"Within each timeslot several parallel sessions will take place and participants can choose which session they will join in each timeslot. A brief outline of each session and the planned presentations will be given followed by the program schedule.

"Timeslot 1) Mathematics Education and Culture
Theme 1: Social History of Mathematics Education

"This theme concerns some significant aspects of the history of mathematics education, which has contributed to the determination of today's situation. The first speaker, the Hungarian mathematics historian Arpad Szabo, will show in his presentation "Mathematics and Dialectic" that fundamental principles like mathematical definitions, reasoning and proving were raised by the philosophy of the Eleatics; and that the system of mathematics as it is formulated in Euclid's Elements, is partly stimulated by the dialectics of Eleaticism, and is partly a further developed construction based on these dialectics. Ahmed Djebbar from Algeria will compare the contents of mathematics education of North Africa in the middle ages with its role in actual teaching. John Fauvel from the Open University, UK, will set up the question: "Should we bring back the mathematical practitioner?" referring to some important aspects of the social history of mathematics education in the Renaissance. In a case study of Britain he will report how British mathematics educators coped with didactic problems, how they had to struggle for acceptance of mathematics as a practical and academic subject, and in which debates about teaching practices they were involved. Gert Schubring, FRG, will discuss

theoretical categories for investigations in the social history of mathematics education and some characteristic patterns. He will aim to offer a more comprehensive framework for historical studies as well as for an understanding of the role of mathematics in both liberal education and vocational training."

Canadian Journal Is a Good Source of Historical Articles

For the Learning of Mathematics is an international journal of mathematics education edited and published in Montréal. It consistently carries articles of high quality and interest, including articles dealing with history and teaching. Many of the historical articles have been included in "Have You Read?" in this *Newsletter*. However, there are many other articles not of a historical nature that mathematics educators would find of interest. A recent issue (November 1987) carried the following: Raffaella Borasi, "Exploring mathematics through the analysis of errors"; Eva Puchalska & Zbigniew Semadeni, "Children's reactions to verbal arithmetical problems with missing, surplus or contradictory data"; Alain Bouvier, "The right to make mistakes"; Mary Harris, "An example of traditional women's work as a mathematics resource"; Guershon Harel, "Variations in linear algebra content presentations"; Pearla Neshet, "Towards an instructional theory: the role of students' misconceptions"; Gert Schubring, "On the methodology of analysing historical textbooks: Lacroix as textbook author" (see Have You Read? in this issue). The content and form are so consistently high that, as a service to our readers, the following information is provided from the journal.

"The journal is published three times a year, in February, June and November, by the FLM Publishing Association, 4336 Marcell Avenue, Montreal, Quebec, Canada H4A 2Z8. The annual subscription rate is \$30.00 (institutions and libraries) or \$21.00 (private individuals). Subscribers in countries other than Canada should pay these amounts in U.S. dollars. Subscriptions should be sent to the publisher and may be paid by cheque drawn on a Canadian

or U.S. bank or by international money order."

**MATHESIS: the Mexican Journal of
Philosophy and History of Mathematics**

Mathesis: Revista de investigación, divulgación e información en Filosofía e Historia de las Matemáticas. **Finalidad**: La meta principal de esta revista es proporcionar las fuentes necesarias—tanto primarias como secundarias—para realizar investigación original en las áreas de historia y filosofía de las matemáticas, así como facilitar el material esencial para el desarrollo satisfactorio de los cursos de licenciatura y posgrado relacionados con éstas. Las fuentes comprenden: ensayos, artículos, libros, crónicas, reseñas y sumarios, algunos ya publicados con anterioridad, pero que, por su escasa distribución, costosa adquisición o por encontrarse publicados en lenguas extranjeras, se han hecho inaccesibles para el estudiante e investigador. La revista intenta proporcionar la oportunidad de conocer lo que actualmente se está realizando en estos ámbitos por profesionales en dichas materias. Para esto, el consejo editorial se ha propuesto presentar a los lectores los trabajos más recientes de estos expertos. Otra de sus finalidades es publicar libros completos—agotados o inaccesible—facilitando su acceso y estudio. **Naturaleza**: La revista está abierta a todos los puntos de vista, a todos los acercamientos y a todos los aspectos de la historia y filosofía de las matemáticas (incluye biografías, educación, aplicaciones, organizaciones, instituciones, etc.). También contempla la historia y filosofía de otras disciplinas—e.g., física y biología—cuando éstas tratan aspectos relacionados con nuestras áreas de estudio. **Periodicidad**: La revista se publica cuatro veces al año. Cada volumen anual contiene un número aproximado de 500 páginas.

Estructura: La revista está integrada por las siguientes secciones, que no necesariamente aparecen en todos los números: *Artículos*, incluye Fuentes primarias y secundarias—tanto en historia como en filosofía—y contempla la publicación periódica de libros completos; *Notas educativas*, comprende la publicación de pequeños artículos, notas y noticias sobre

diversos programas y cursos en las dos áreas mencionadas. En esta sección se incluyen ensayos que discuten los usos de la historia y la filosofía en educación matemática; *Proyectos de trabajo*, contiene información de proyectos académicos en preparación o en pleno desarrollo, incluyendo temas de tesis, retos, preguntas y respuestas; *Noticias y avisos*, informa a los lectores de congresos, reuniones, conferencias, invitaciones, notas necrológicas y otros eventos de interés que realice la comunidad de filósofos e historiadores; *Ensayo-reseñas*, presenta reseñas extensas que intentan, en detalle, inspeccionar trabajos primarios y secundarios. Los ensayos están dedicados a algunas obras que se consideran clásicas en estas disciplinas; *Reseñas*, pretende presentar revisiones críticas de obras, tanto pasadas como actuales, que conforman estas materias; *Fuentes*, informa a los lectores de los acervos de bibliotecas mexicanas y latinoamericana para facilitar la localización de libros y revistas. También propone describir el contenido de las distintas revistas que se publican o se han publicado en la lengua española (e.g., Matemáticas y Enseñanza, Ciencia y Desarrollo, Investigación Científica, Historia Mexicana, Nexos, Razones, Proceso, Naturaleza, Revista de Occidente, etc.). A largo plazo, esta sección informará de la localización de materiales relacionados con nuestras áreas de trabajo en archivos, universidades y otras instituciones nacionales e internacionales; *Información bibliográfica*, Ofrece al lector la información bibliográfica que le permita mantenerse al día en el conocimiento de las más recientes publicaciones.

Correspondencia: Mathesis, Cubículo 027, Departamento de Matemáticas, Facultad de Ciencias, UNAM, 04510 México, D.F., México. [From *Mathesis*.]

ICMI Study Series Translations

The Spanish translation of the '1990's' study has now been published as *Las Matemáticas en primaria y Secundaria en la década de los 90*, Mestral Libros, ISBN 84-7575-207-1. Readers of Spanish may also be interested in a companion volume published by the same publishers, *Aportaciones al debate sobre las*

Matemáticas en los 90 (ISBN 84-7575-227-6), which gives the response of Spanish mathematics educators to the original '1990's' discussion document.

Arabic, Catalan and Japanese translations of *School Mathematics in the 1990s* (Cambridge University Press) are now in preparation, as are Arabic and Japanese translations of *The Impact of Computers and Informatics on Mathematics and Its Teaching*, the first volume in the ICMI Study Series.

[From ICMI Bulletin No. 23 (Dec 1987), p. 13.] □

British Historians Will Feature Mathematics and History, September 1988

[Colin R. Fletcher —] The residential conference of the British Society for the History of Mathematics for 1988 will be held at the University of Leicester, from lunchtime Thursday, 1 September, to lunchtime Saturday, 3 September. Most of the sessions will be devoted to the theme "The use of history in mathematics teaching and pedagogy", but there will also be papers on the history of mathematics in general. A visit to the library of the Mathematical Association is planned. The cost of the meeting will be about £55, and day rates will be available.

Those interested in attending may request further information from the Secretary, Dr Colin R. Fletcher, Department of Mathematics, The University College of Wales, Aberystwyth, U.K. Those interested in presenting a paper should write to the President, Dr Ivor Grattan-Guinness, Middlesex Polytechnic, Faculty of Engineering Science and Mathematics, Queensway, Enfield, Middlesex, U.K. Of particular interest are papers of the general kind, although reports on individual experiences will be welcome.

[Those interested in memberships in the Society may contact the Secretary, Dr Fletcher, at the address above.—Ed.]

[Dr Fletcher is the Secretary of British Society for the History of Mathematics.] □

Have You Read?

Readers are asked to submit contributions. References need not deal exclusively or explicitly with history in the mathematics classroom, but should have the

potential for motivating or enriching. N.B. Supply complete bibliographic information: names of author(s); complete titles of books, articles and journals; for journals include both the volume and date; for books, edition, copyright date, publisher and place of publication. Accuracy in spelling and wording is critical. Please provide concise annotations whenever possible.

Albis, Victor S. 1986 "Arte prehispánico y matemáticas" *Rev. de la Universidad Nacional de Colombia* (2a época) 2:7, 29-34. Symmetry groups as a culture clue and archeological classification.

Albis, Victor S.; Guillermo Páramo 1987 "Antropología y matemáticas" *Mathesis* (Mexico) 3:1 (Feb) 163-67.

Álvarez J., Carlos 1985 "Gottlob Frege, cálculo y características" *Mathesis* (Mexico) 1:2 (May) 129-36.

— 1987 "El nacimiento de la teoría de los números cardinales transfinitos" *Mathesis* (Mexico) 3:1 (Feb) 89-93.

Álvarez, Carlos; Santiago Ramírez 1987 "Jean van Heijenoort (1912-1986), de Coyoacán a Brandeis" *Mathesis* (Mexico) 3:1 (Feb) 73-74.

Anellis, Irving H. 1987 "Bibliografía de Jean van Heijenoort" *Mathesis* (Mexico) 3:1 (Feb) 85-88.

Arboleda, Luis Carlos 1986 "Euler y las matemáticas de la Ilustración" *Notas de Matemática* (Bogotá) 21, 1-33.

Arcavi, A., Bruckheimer, M., Ben-Zvi, R. 1987 "History of mathematics for teachers: the case of irrational numbers" *For the Learning of Mathematics* 7:2, 18-23

Ascher, Marcia 1987 "Mu Torere: an analysis of a Maori game" *Mathematics Magazine* 60, 90-100.

Aujac, G. 1985-1986 "Problèmes de traduction dans le livre V d'Euclide" *Science et Techniques en Perspective* 10, 1-9.

Baum, Joan 1986 *The Calculating Passion of Ada Byron* Archon Books [ISBN: 0-208-02119-1].

Benis-Sinaceur, Hourya 1987 "Estructura y concepto en la epistemología matemática de Jean Cavailles" *Mathesis* (Mexico) 3:1

(Feb) 15-31.

- 1987 "El teorema de álgebra de Ch.F. Sturm revisado por J.J. Sylvester" *Mathesis* (Mexico) 3:4 (Nov) 401-13.
- Bennett, Albert B., Jr. 1988 "Visual thinking and number relationships" *Mathematics Teacher* 81:4 (April) 267-72.
No history as such, but has classroom ideas using figurate numbers.
- Bennett, J.A. 1987 *The Divided Circle: A History of Instruments for Astronomy, Navigation and Surveying* Oxford: Phaidon/Christie's.
- Berggren, J.L.; B.R. Goldstein (Editors) 1987 *From Ancient Omens to Statistical Mechanics* (Acta Historica Scientiarum Naturalium et Medicinalium, 39) Copenhagen: University Library.
- Bibby, John 1986 *Notes Toward a History of Teaching Statistics* Edinburgh: John Bibby (iii + 156 pp)
Photo-offset from typescript, with illustrations, figures, index. [Address appears incomplete in source consulted; further information solicited from readers. -Ed.]
- Bissel, Christopher C. 1987 "Cartesian geometry: the Dutch connection" *Mathematical Intelligencer* 9:4, 38-44.
Emphasizes the role of van Schooten's Latin translation of Descartes' *Géométrie* in acquainting the learned world with analytic geometry.
- Blay, M. 1985-1986 "L'introduction du calcul différentiel en dynamique: l'exemple des forces centrales dans les Mémoires de Varignon en 1700" *Sciences et Techniques en Perspective* 10, 157-90.
- Brabenec, Robert L. 1987 "A required reading program for mathematics majors" *American Mathematical Monthly* 94:4 (Apr) 366-68.
Undergraduate students are required to read and react to a list of articles.
- Butzer, P.L. 1986 "Auf den Spuren zweier Aachener Mathematiker zur Zeit der Aufklärung: Johann Peter Carlier (ca.1680-1725) und Johann Joseph Crümmel (1729-1807)" *Zeitschrift des Aachener Geschichtsvereins* 93, 151-62.
- Butzer, P.L.; R. Wald; H. Adam 1986 "Auf den Spuren dreier um 1510 in Münster Westfalen wirkender rheinischer Mathematiker, mit einer Übersetzung und Kommentierung von Gymnichs Vorrede zu Kemners 'Compendium'." *Annalen des historischen Vereins für den Niederrhein* 189, 65-96.
- Cauty, A. 1985-1986 "Contribution ethnographique à l'histoire des sciences à propos de la numération maya" *Sciences et Techniques en Perspective* 10, 10-39.
- Castellanos, Dario 1988 "The ubiquitous π " Part I and II. *Mathematics Teacher* 61:2 (Apr) 67-98, and 61:3 (Jun) 148-63.
A catalogue of calculations in which π is essential.
- Chevaley, Catherine [1985] Información bibliográfica, Claude Chevaley, *Mathesis* (Mexico) 1:4 (Nov) 649-56.
- Clements, R.R.; P. Lauginie; E. de Turckheim (Editors) 1988 *Selected Papers on the Teaching of Mathematics as a Service Subject* Springer-Verlag.
A companion volume to A.G. Howson, et al (Eds), produced by the International Commission of Mathematical Instruction (ICMI) of which HPM is a study group.
- Cook, B.F. 1987 *Reading the Past: Greek Inscriptions* Berkeley: University of California Press/British Museum [ISBN: 0-520-06113-6]
An attractive, well-produced booklet (64 pp) describing Greek epigraphy. No mathematics, except for passing reference to the numeration system.
- Dahan-Dalmédico, Amy 1987 "Mécanique et théorie des surfaces: les travaux de Sophie Germain" *Historia Mathematica* 14:4 (Nov) 347-65.
- Daston, Lorraine J. 1986 "The physicalist tradition in early 19th century French geometry" *Studies in History and Philosophy of Science* 17, 269-95.
Carnot's and Monge's influence on Poncelet and Chasles, and on the use of synthetic geometry.

- Dauben, Joseph 1988 "Let freedom ring." *Consortium* 26 (May) 7-8.
Using the trials and tribulations of Cantor in securing a fair hearing for his new set theory, mathematics is related to larger social and ethical issues.
- Davies, W.V. 1987 *Reading the Past: Egyptian Hieroglyphs* Berkeley: University of California/British Museum [ISBN: 0-520-06287-6].
A concise, well-produced booklet (64 pp) describing the history, principles, derivative systems, and the modern deciphering by Champollion.
- Dhombres, J. 1985-1986 "Les présupposés d'Euler dans l'emploi de la méthode fonctionnelle" *Sciences et Techniques en Perspective* 10, 191-249.
- Dijksterhuis, E.J. 1987 *Archimedes Translated* by C. Dikshoorn; new bibliographic essay by Wilbur Knorr. Princeton: Princeton University Press.
First published in 1956, now in paperback.
- Dilke, O.A.W. 1987 *Reading the Past: Mathematics and Measurement* Berkeley: University of California/British Museum [ISBN: 0-520-06072-5].
An attractive, well-illustrated, and concise booklet (64 pp) describing numeration systems and measuring instruments of the ancient Egyptians, Sumerians, Babylonians, and Greeks.
- Dugac, Pierre 1986-1987 *Histoire de la notion de limite: Des scribes Babyloniens à Simon Stevin* Paris: Université Pierre et Marie Curie (67 pp)
Lecture notes from the history of science program option.
- Dunham, William 1986 "A 'Great Theorems' course in mathematics" *American Mathematical Monthly* 93:10 (Dec) 808-811.
Description of a course for undergraduates that eschews selling mathematics as a tool for commerce or computers and instead focuses on proof and history.
- 1987 "The Bernoullis and the harmonic series" *College Mathematics Journal* 18, 18-23.
- Dutka, Jacques 1986 "On square roots and their representations" *Archive for History of Exact Sciences* 36:1, 21-39.
Survey of methods used in calculating square roots, from Babylonian to present.
- 1988 "On the Gregorian revision of the Julian calendar" *Mathematical Intelligencer* 10:1 (Winter 1988) 56-64.
Determining the date of Easter is the overarching motivation. Contains several good illustrations.
- Eves, Howard W. 1988 *Return to Mathematical Circles: A Fifth Collection of Mathematical Stories and Anecdotes* PWS-Kent
- Fernández, Begoña; Miguel Angel García 1985 "Historia de la teoría de la probabilidad" *Mathesis* (Mexico) 1:4 (Nov) 607-29.
- Franci, R.; L. Toti Rigatelli 1985 "Towards a history of algebra from Leonardo of Pisa to Luca Pacioli" *Janus* 72, 17-82.
- Fraser, Craig G. 1987 "Joseph Louis Lagrange's algebraic vision of the calculus" *Historia Mathematica* 14:1 (Feb) 38-53.
- Froelich, Gary 1988 "Hotel infinity. There's always room at the inn." *Consortium* 26 (May) 10-11.
A story illustrating some of the surprises in the concept of infinity.
- Ganitanand 1986 "When there was no unity in the number-land" *Ganita-Bhārat* 8, 44-45.
- Gessel, Ira; Gian-Carlo Rota, Eds. 1987 *Classic Papers In Combinatorics* Boston: Birkhäuser. [ISBN: 0-8176-3364-2]
A survey of developments since 1930.
- Gillies, Donald A. 1987 "Was Bayes a Bayesian?" *Historia Mathematica* 14:4 (Nov) 325-46.
The author answers his question in the affirmative, although Bayes was cautious.
- Gindikin, Semyon Grigorevich 1987 *Tales of Physicists and Mathematicians* Boston: Birkhäuser. [ISBN: 0-8176-3317-0]

- Biographical accounts of Cardano, Tartaglia, Galileo, Huygens, Pascal and Gauss, among others; high school and undergraduate level.
- Gjertsen, Derek 1986 *The Newton Handbook* London: Routledge & Kegan Paul (US, Metheun) [ISBN: 0-7102-0279-2]
Encyclopedic treatment of terms and topics related to Newton. Bibliography of Newton's writings.
- Glas, Eduard 1986 "On the dynamics of mathematical change in the case of Monge and the French revolution" *Studies in History and Philosophy of Science* 17, 249-68.
- Gleason, Andrew M. 1988 "Angle trisection, the heptagon, and the triskaidecagon" *American Mathematical Monthly* 95:3 (Mar) 195-94.
Solving the cubic and constructing polygons with ruler, compass and an angle-trisector.
- Grabiner, Judith 1987 "The centrality of mathematics in the history of western thought" in *Proceedings of the International Congress of Mathematicians* (1986, Berkeley, California). Providence, Rhode Island: American Mathematical Society.
- Grattan-Guinness, I. (Editor) 1987 *History in Mathematics Education: Proceedings of a Workshop Held at the University of Toronto, July-August 1983*. Paris: Belin (8, rue Férou, 75006 Paris).
Contains topics from antiquity to nineteenth century, and a good bibliography. [See extended comments in this issue # 16.]
- Greenberg, John L. 1986 "Mathematical physics in eighteenth-century France" *Isis* 77:286 (Mar) 59-78.
- Gregory, Nicola Graves 1987 *Who Carved Up the Integers? (They Never Died)* London: Mathemagica (20, Birchington Road, London N8)
Subtitled, "A Monograph on the Importance of the Integers and the Possibility of a Historically and Philosophically Self-conscious Mathematics, or The Method of Exhaustion, the Endless Screw and the Linear Plot".
- Gupta, R.C. 1986 "On derivation of Bhāskara I's formula for the sine" *Ganita-Bhārat* 8 39-41.
- Harper, Eon 1987 "Ghosts of Diophantus" *Educational Studies in Mathematics* 18: (Feb) 75-90.
Arguing that children acquire algebraic knowledge in the historical sequence, the author suggests that curriculum developers pay more attention to mathematics history.
- Heinekamp, Albert (Ed) 1986 *300 Jahre "Nov. Methodus" von G.W. Leibniz (1684-1984)* Symposium der Leibniz-Gesellschaft in Congresszentrum "Leevenhorst" in Noordwijkerhout, Nederland, 28. bis 30 August 1984. (Studia Leibnitiana, 14 Stuttgart: Franz Steiner Verlag.
- Herz-Fischler, Roger 1987 *A Mathematica History of Division in Extreme and Mean Ratio* Waterloo, Ont: Wilfred Laurier University Press
- Howson, A.G.; J.-P. Kahane, P. Lauginie, E. d. Turckheim (Editors) 1988 *Mathematics as a Service Subject* Cambridge University Press.
A publication of the International Commission on Mathematical Instruction (ICMI) of which HPM is a study group. See also R.R. Clements, et al (Eds).
- Højrup, Else 1987 *Women of Science Technology, and Medicine: A Bibliography* Denmark: Roskilde University Library (P.O. Box 258, DK-4000 Roskilde, Denmark)
Listing of biographical sources from many countries on women, including mathematicians. [Free from publisher.]
- Højrup, Jens 1986 "Al-Khwārizmī, Ibn Turk, and the *Liber mensurationum*: on the origins of Islamic algebra" *Erdem* 2, 445-84.
- Jones, Charles V. 1987 "Las paradojas de Zenón y los primeros fundamentos de la matemáticas" *Mathesis* (Mexico) 3:1 (Feb) 3-14.
1987 "La influencia de Aristóteles en el fundamento de Los Elementos de Euclides" *Mathesis* (Mexico) 3:4 (Nov) 375-87

- Kak, S. 1986 "Computational aspects of the Aryabhata algorithm" *Indian Journal of History of Science* 21, 62-71.
- Katz, Victor J. 1987 "The calculus of the trigonometric functions" *Historia Mathematica* 14:4 (Nov) 311-24.
- 1988 "Who is the Jordan of Gauss-Jordan?" *Mathematics Magazine* 61:2 (Apr) 99-100.
The answer is not Camille Jordan, as so often reported in text books; rather Wilhelm Jordan, a German geodesist. [This may require adjustment in pronunciation for some teachers.]
- Kepler, J. 1987 *Kepler's Physical Astronomy* Springer-Verlag (ISBN: 0-387-96541-6)
Critical edition of Kepler's *Astronomia nova*.
- King-Hele, D.F.; A.R. Hall (Eds) 1988 *Newton's Principia and Its Legacy* (Proceedings of a Royal Society discussion meeting held in London, 30 June 1987) London: Royal Society.
- Kluvanek, I. 1987 "Archimedes was right" *Elements der Mathematik* 42:3,4 (May) 51-61, 83-92.
Links Archimedes' methods of finding area to modern integration theories.
- Knorr, Wilbur 1986 *The Ancient Tradition of Greek Problems* Boston: Birkhäuser.
Focuses on the history of the attempts to solve the three problems of antiquity: viz., duplication of the cube, trisection of the angle, and quadrature of the circle.
- Kuhn, Stephen W. 1988 "The number phoenix: a summer awakening" *Mathematics Teacher* 81:4 (Apr) 315-21
Description of summer course for grades 7 - 11 students, focused on number theory but integrating history. A good model for HPM.
- Laugwitz, Detlef 1987 "Infinitely small quantities in Cauchy's textbooks" *Historia Mathematica* 14:3 (Aug) 258-74.
An examination of Cauchy's "so-called errors" in his *Cours d'analyse*.
- Lay-Yong, Lam 1986 "The conceptual origins of our numeral system and the symbolic form of algebra" *Archive for History of Exact Sciences* 36:3, 183-95.
- Lértora Mendoza, Celina A. 1987 "La obra 'De Quadratura circuli' atribuida a Roberto Grosseteste" *Mathesis* (Mexico) 3:4 (Nov) 389-400.
- LinFoot, Joyce 1987 "George Parker Bidder: the calculating prodigy" *Institute of Mathematics and Its Applications Bulletin* 23:3/4/5 (Mar/Apr/May) 68-71.
- Lo Bello, Anthony J. 1988 "The volumes and centroids of some famous domes" *Mathematics Magazine* 61:3 (Jun) 164-70.
Mathematics that can be applied to historical developments, although this article is not itself historical.
- Loeffel, Hans 1987 *Blaise Pascal, 1623-1662* Basel/Boston: Birkhäuser.
- Mac Lane, Saunders 1988 "Group extensions for 45 years" *Mathematical Intelligencer* 10:2, 29-35.
- Manuel, George; Amalia Santiago 1988 "An unexpected appearance of the golden ratio" *College Mathematics Journal* 19:2 (Mar) 168-70.
Analyzing impedance of electrical circuits yields golden ratio. No history, as such.
- Martínez, Rafael 1985 "Giordano Bruno y la tradición hermética" *Mathesis* (Mexico) 1:4 (Nov) 635-43.
- Martzloff, Jean-Claude 1988 *Histoire des mathématiques chinoises* (Intro. by J. Gernet and J. Dhombres) Paris/Milan: Masson.
- Marquina, José E. 1987 "El atomismo de Epicuro" *Mathesis* (Mexico) 3:1 (Feb) 155-162.
- Martínez E., J. Rafael 1987 "La perspectiva y especularia de Euclides" *Mathesis* (Mexico) 3:1 (Feb) 169-74.
- Middleton, Karen P. 1986 "The role of Russell's Paradox in the development of twentieth-century mathematics" *Pi Mu Epsilon Journal* 8:4 (Spring) 234-41.
An expository paper written by a student, dealing with the problems inherent in 'the set of all sets'.

- Monastyrsky, Michael 1987 *Riemann, Topology, and Physics* Transl: James King, et al Boston: Birkhäuser Boston [ISBN: 0-8176-3262-X]
Contains biography of Riemann, along with a monograph on homotopy theory.
- Moreno A., Luis; Guillermina Waldegg 1987 "El análisis matemático y su aritmetización" *Mathesis* (Mexico) 3:1 (Feb) 49-72.
- Pappas, Theoni 1986 *The Joy of Mathematics* San Carlos: MathAids (P.O. Box 64, San Carlos, CA 94070).
Short articles, some containing history.
- Parshall, K. 1985-1986 "Le développement de la théorie des algèbres au 19ème siècle" *Sciences et Techniques en Perspective* 10, 129-44.
- + Peterson, I. 1988 "Following pi down the decimal trail" *Science News* 133 (Apr 22) 215.
Reports on calculations of Y. Kanada which have reached 200 million decimal places—a topic always arising in history classes.
- Petrova, S.S. 1987 "Heaviside and the development of the symbolic calculus" *Archive for History of Exact Sciences* 37:1, 1-23.
- Phillips, Esther R. (Ed) 1987 *Studies in the History of Mathematics* MAA Studies in Mathematics, Vol. 26. Washington, D.C.: Mathematical Association of America.
A collection of articles on topics in the undergraduate curriculum.
- Pont, Jean-Claude 1986 *L'Aventure des parallèles. Histoire de la géométrie non-euclidienne: Précurseurs et attardés* Berne/New York: Peter Lang.
- Pyenson, Lewis 1985 "Functionaries and seekers in Latin America missionary diffusion of the exact sciences, 1850-1930" *Quiju* 2, 387-420.
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Have You Seen?

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ABU-L-QASIM (From a 15th century Arab ms., Biblioteca de Cataluna) Felip p 239.*

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ARCHIMEDES (painting by Ribera, in Del Prado Museum, Madrid) Felip p 154.*

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BOETHIUS (illustration from a medieval incunabula) Felip p 75.*

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*PROVIDED BY VICTOR ALBIS

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