International Study Group on the Relations Between
HISTORY and PEDAGOGY of MATHEMATICS
NEWSLETTER

AN AFFILIATE OF THE INTERNATIONAL COMMISSION ON MATHEMATICS INSTRUCTION

No. 38 July 1996

HPM ADVISORY BOARD

John Fauvel, CHAIR
Mathematics Faculty
The Open University
Milton Keynes MK7 6AA
England, UK

Victor J. Katz, EDITOR
Department of Mathematics
University of the District of Columbia
4200 Connecticut Ave. N.W.
Washington, DC 20008 USA

George Booker AUSTRALIA; Jacques Borowczyk FRANCE; Ubiratan D'Ambrosio BRAZIL (former chair); Florence Fasanelli USA (former chair); Lucia Grugnetti ITALY; Hans Niels Jahnke GERMANY; Maasouma Kazim EGYPT; Israel Kleiner CANADA; Osamu Kota JAPAN; Jan van Maanen NETHERLANDS; Mohini Mohamed MALAYSIA; Charles V. Jones USA (Americas Section chair); Eduardo Veloso PORTUGAL.

Calendar

1996 July 8 - 12   Liverpool
Science in Greek Antiquity, an international conference on ancient science. (See inside for more details.)

1996 July 14 - 21   Seville
ICME - 8. (Eighth International Congress on Mathematical Education) The latest information is available on the World Wide Web: http://icme8.us.es/ ICME8.html. (See inside for more details.)

1996 July 24 - 30   Braga, Portugal
Quadrennial International HPM meeting in connection with ICME, also including the Second European Summer University on History and Epistemology in Mathematics Education. (See inside for more details.)

1996 August 19 - 24   Prague
Mysterium Cosmographicum 1596-1996. This symposium, to be held at the National Technical Museum, Prague, is devoted to the history and present status of our ideas about the universe since a concept of cosmological research was formulated by Kepler in his *Mysterium cosmographicum*.   Topics include the conceptual role of this work in Kepler's own work and its influence on the scientific ideas of the 17th century, the development of Newtonian cosmology, and new approaches subsequently. For further information, contact Jaroslav Folta, Society for the History of Science and Technology, National Technical Museum, Kostelni 42, 170 78 Praha 7, CZECH REPUBLIC; fax: 0042-2379-151.

1996 August 27 - 29   Isfahan, Iran
First Iranian Mathematics Education Conference. Among the themes of the conference are popularizing mathematics throughout schools, history of mathematics, and the school mathematics.   The Organizing Committee will provide local accommodations for those with accepted

contributions.   For further information, contact Professor Ali Rejali, Chairman, Scientific Committee, FIMEC, School of Mathematics, Isfahan University of Technology, Isfahan, 84156, IRAN; fax: 98318912602; email: a_rejali@rose.imp.ac.ir.

1996 September 13 - 15   Cambridge, England
Autumn residential meeting of the British Society for the History of Mathematics. The topic is Mathematics and the Real World. The meeting will focus on the theme of the changing relations between mathematics and the world, from mixed mathematics to applied mathematics to mathematical modelling.   For more information, contact Adrian Rice, 71 Plimsoll Rd., London N4 2EB, U.K.; email: ar027@mdx.ac.uk.

1996 October 4 - 5 Akron, Ohio
Tenth anniversary Midwest Conference on the History of Mathematics to be held at the University of Akron. Abstracts for 15 or 30-minute contributed papers are due by August 15.   For further information, contact Douglas Cameron, Department of Mathematical Sciences, The University of Akron, Akron, OH 44325-4002; email: DouglasCameron@uakron.edu.

1996 October 5   Toronto
One-day conference in honor of Abe Shenitzer, to be held at York University. (See inside for more details.)

1996 November 7 - 10   Atlanta
Annual meeting of the History of Science Society. This meeting will include several talks dealing with the history of mathematics. For more details, contact the History of Science Society, c/o Keith R. Benson, Executive Secretary, Box 351330, University of Washington, Seattle, WA 98195-1330, USA; tel: 206-543-9366; fax: 206-685-9544; email: hssexec@u. washington.edu.

1997 January 8 - 11   San Diego
Annual meeting of the American Mathematical Society and the Mathematical Association of America. There will be sessions dealing with the history of mathematics and its use in teaching. (See inside for more details.)

1997 June 21 - 24   Calgary
Conference of the International History, Philosophy & Science Teaching Group. (See inside for more details.)

1997 July 25 - 30   Liège, Belgium
Twentieth International Congress of the History of Science. The main theme of the congress will be Science, Technology and Industry, but there will be sessions devoted to the history of mathematics. For more information, contact XXth International Congress of History of Science Congress Office, Centre d'Histoire des Sciences et des Techniques, Université de Liège, Avenue des Tilleuls 15, B-4000 Liège, BELGIUM; tel: 32 41 66 94 79; fax: 32 41 66 95 47.

From the Chair
John Fauvel

Over the last four years, the HPM Study Group has continued to explore, research, and promote relations between history and pedagogy of mathematics. Much has been achieved. A number of major international conferences have been held; twelve newsletters have been published and distributed to an ever-wider list of people around the world; books have appeared arising out of conferences and related activities; and continued progress has been made by education researchers in working towards programmes for exploring and evaluating the relations between history and pedagogy. Most importantly, an increasing number of teachers in mathematics classrooms throughout the world have found their interest in using history of mathematics awakened, and have found support through this group in learning about the range of possible ways in which this can be done and the value of doing so.

This is the last HPM *Newsletter* before the summer meetings in Seville

and Braga at which a new chair and a new editor will be elected; hence this stocktaking. I have been rereading my first "From the Chair" column in *Newsletter* 27 (November 1992) and am pleased to see how many of the themes I discussed there continue to matter. In particular, I emphasized to what an extent the HPM movement depends on the quality and devoted work of many people in many countries, and I would like here to pay tribute to the enthusiasm, time, and energy which has been shown by so many colleagues across the world. Two overlapping groups in particular, the advisory board and the group of distributors of the *Newsletter*, are now 24 in number. The Study Group is greatly indebted to our distributors, and to their supporting institutions, who generally take responsibility for copying the *Newsletter* from masters supplied by the Editor, and distributing it by post and at meetings to interested people in their areas, as well as promoting the HPM throughout their distribution areas. Thank you all very much.

A fine example of achievement is the recent appearance of thirty of the talks given in the HPM programmes at Toronto and Québec four years ago, ably edited by Ronald Calinger and now published by the Mathematical Association of America in a volume on which much loving care has been devoted, called *Vita Mathematica: Historical Research and Integration with Teaching*. The text on the back cover of this lavishly-designed book gives a fair summary of the content: "This volume demonstrates that the history of mathematics is no longer tangential to the mathematics curriculum, but deserves a central role."

Several individuals within HPM have been formulating and conducting research in different countries on the use of history of mathematics in mathematics education. Some of the results of this research have been communicated at HPM meetings, at meetings of other organisations, and through papers in the usual journals. One of the benefits of the considerable consolidation and growth of interest in HPM over the past four years is that a research programme is beginning to emerge, with contributions from many places over the globe, which is now about ready to be put into operation. This will involve a consolidated critical bibliography of work that has been done hitherto (over the last century, and increasingly since HPM became established in recent years), and a programme for developing a deeper understanding of the factors involved in the relations between history and pedagogy of mathematics, in different areas of mathematics, and with pupils and students at different stages and with different environments and backgrounds. One of the main challenges for HPM in the next quadrennium, besides the further wide promotion of interest in its area of concern, will be to work on the long-promised ICMI study, and report back by the end of the millennium.

I want to end with some words of thanks to the editor who has guided the *Newsletter* throughout this period, and indeed for the four years before that. Victor Katz has been responsible for producing 24 issues of the *Newsletter* since 1988. The *HPM Newsletter* fulfills a crucial role. For very many readers, the *Newsletter* is the main source of information about the activities of others in this field. To a considerable extent, HPM **is** its *Newsletter*, and the role of the editor is pivotal. We have been exceedingly fortunate to have had in Victor an editor of superlative efficiency and powerful editorial skills who brought out the *Newsletter* with unfailing regularity, unperturbed by bringing out his highly acclaimed *History of Mathematics: An Introduction* (HarperCollins, 1993) at the same time. Not the least of Victor's achievements over his period as editor is to have built up the panel of distributors so that there is now a very strong distribution network which serves also as a local focus for HPM activities

and promotion. Having been appointed at the beginning of the previous quadrennium in 1988, that is, having now served an eight-year, 24 issue stint, Victor is giving up the editorship at Braga and applying his energies to fresh challenges. He is not abandoning HPM, but is becoming chair of the Americas Section. We are all very greatly in his debt.

From the Editor
Victor J. Katz

The current issue of the *Newsletter* is the final one which I will edit. I have very much enjoyed editing this *Newsletter* over the past eight years, but now it is time to turn over the editorship to someone else. The new editor, Gerard Buskes, of the University of Mississippi, will assume his duties with the next issue. I am certain that he will continue the traditions begun by my predecessors as well as develop many new ideas of his own. It is also gratifying that the University of Mississippi will subsidize the publication of the *Newsletter* so that we will continue to be able to give it wide distribution around the world. I urge all of you to contribute to the *Newsletter* so that it continues to provide the means of communication among all mathematicians and mathematics educators committed to using history to improve the mathematical education of students all over the globe.

I want to take this opportunity to thank the many people who have made my job easier over the past eight years, including the two chairs of HPM with whom I have worked, Florence Fasanelli and John Fauvel, the editor of the Have You Read column, Ron Calinger, and the many other contributors of articles over the years. I also want to thank those at the University of the District of Columbia who have made possible the printing and mailing of this *Newsletter*: Deans Phillip Brach and Beverly Anderson, Associate Deans Theodola Milligan and Bernis Barnes, and the head of the Printing Production office, Roland Bland. Finally, I want to thank my daughter Naomi for the many hours she spent attaching address labels and my wife Phyllis for her loving support of this effort.

I will be continuing my own contribution to HPM as chair of the Americas Section and will detail some of my ideas in that regard in the next issue.

Annual Meeting of the Americas Section of HPM - San Diego
Erica Dakin Voolich, Secretary

The Americas Section of HPM met in conjunction with the National Council of Teachers of Mathematics (NCTM) Annual Meeting in San Diego on 26 April, 1996. Prior to the business meeting, we enjoyed seven presentations.

Art Johnson spoke about "Math History in the Media." He shared numerous examples of articles and cartoons that he uses in his classroom to humanize mathematics and give students background for the ideas they are studying.

Shawnee L. McMurran spoke about "Women and the *Educational Times*." The *Educational Times* was a journal published in the late nineteenth century to raise the standard of teaching, to educate the middle class, and to promote learning and communication between teachers. The *Times* included various problems for solving that were contributed by its readers. Among its contributors of both problems and solutions were seven women at Girton College, including Sarah Marks (the first woman member of the electrical engineering society), Charlotte Scott (chair, Bryn Mawr mathematics department), and Kate Gale (teacher in South Africa).

James Tattersall's talk "Women and the Tripos Exam" was a continuation of McMurran's. The Cambridge mathematical tripos examination dates from the 15th century and is called the tripos because the moderator sat on a 3-

legged stool for the duration of the 55-hour test. He told of two women who distinguished themselves on the exam. Charlotte Scott was the first woman to achieve a first class (1880), and Phillipa Fawcett placed above the senior wrangler on the exam in 1890. The talk included problems from the 1880 and 1890 tripos exams.

Barnabas Hughes, in his talk on "Ratios of Points," reminded us that the great men of yesteryear struggled with understanding such ideas as limits. This is illustrated by a very clear but, today, ignored article in the Philosophical Transactions of the Royal Society of London written by Francis Robart, Vice President of the Royal Society. In the article, Robart takes the idea of ratios of volumes, areas, and lines and extends it to points using circles and spheres and their tangents.

Karen Dee Michalowicz shared her experiences leading "A Math Tour in England with Middle School Students." The land of Babbage, Lovelace, Newton, Wren, and many other great mathematicians offers an interesting mathematics tour for students. Included in the tour are visits to Westminster Abbey, where many of the greats are buried, the British Science Museum with its Babbage-Lovelace exhibit, the British Museum where the Rhind Mathematical Papyrus can be found, and Greenwich which is home to the Prime Meridian. The week-long tour interweaves the history of England with the mathematicians born there and the mathematics that developed or can be found there.

In honor of Descartes' 400th birthday, Charles Jones spoke about "Descartes' Pedagogy." The rereading of Descartes from the point of view of current learning theories reveals surprising insights. Although his language and terminology are different, Descartes' ideas on how we learn appear surprisingly similar to ideas being actively researched today. For example,

Descartes seems to imply that his pedagogy includes systematic doubt more than deduction, visual clarity, disregard of rote memorization, learning from concrete experiences, constructivism, and chuncking.

Michael Millar spoke about "A New (?) Way of Motivating the Operations and Properties of Fractions" that he uses with his students who are preservice high school teachers. He demonstrated how to use arrays of dots to generate the fundamental properties of natural numbers. He then used a line, rather than areas, to suggest a short list of axioms from which one can derive the basic laws of fractions. The discussion concluded with a brief examination of how the rule for multiplying two fractions was anticipated over two thousand years ago by Euclid's idea of "compounding of ratios" and his use of this idea in establishing Proposition 23 of Book VI of the *Elements*.

The annual business meeting of the Americas Section was chaired by Charles Jones. The minutes of the last annual meeting were accepted. We are now an affiliate of the NCTM. Barnabas Hughes reported for the nominating committee, which also included Florence Fasanelli and Fred Rickey. Nominated to serve until the Americas Section Annual Meeting in 2000 were Victor Katz, President; David Kullman, Vice-President; Erica Voolich, Secretary; Karen Dee Michalowicz, Treasurer; and Lawrence Shirley, Historian. There were no nominations from the floor. The slate was accepted. Since Sherry Cox was ill, Karen Dee Michalowicz gave the treasurer's report. There is a balance of $1093 in our account, although some money will be used to publish the next *Newsletter*. The dues are $10 per year, but the number paying those dues does not provide sufficient income to pay the cost of publishing the *Newsletter*. Fortunately the University of the District of Columbia has been subsidizing the cost, but the subsidy can no longer be continued. We therefore need to come

to some resolution on the matter of dues. Karen Dee Michalowicz has been sending out first class letters to everyone on the mailing list asking for dues; if a letter is returned by the post office, the person is stricken from the mailing list. A proposal for handling this matter will be discussed by the officers and brought up at the next annual meeting. The nominating committee made some suggestions for changes to the Bylaws. A committee of Barnabas Hughes and Charles Jones was appointed to work with Victor Katz on this before our next meeting.

Barnabas Hughes made a point of thanking Charles Jones for his dedicated service to HPM. Charles was a founding member, the first *Newsletter* editor, instrumental in our reorganization, initiated the affiliation with NCTM, and was our first President under the new Bylaws.

Science in Greek Antiquity

An international conference on ancient science is to be held in Liverpool from July 8 to July 12, 1996. Scholars from Europe, North America, and Australasia will present new research and place it in context. The socio-economic place of ancient scientists and the categorical status of "science" are important parts of the agenda; a fundamental aim of the conference is to locate science within ancient society and culture, to investigate its impact upon that society, and to identify it as a cultural phenomenon deserving no less attention than traditional objects explored by classicists.

Speakers include Len Berggren, "Ancient geography as an integrative discipline for the study of mathematical sciences in the Greco-Roman world;" Reviel Netz, "The Greek mathematicians: a group picture;" Edward Hussey, "Aristotle and mathematics: a survey;" Marinus Taisbak, "Euclid's *Elements* ix.14: why the Greeks did not prove the fundamental theorem of arithmetic,

although they had the necessary tools;" and Serafina Cuomo, "The machine and the city: Hero of Alexandria's public mechanics."

For further details, contact Dr. C. J. Tuplin, Classics and Ancient History, 12 Abercrombie Square, Liverpool L69 3BX, U.K.; email: c.j.tuplin@liv.ac.uk.

HIMED 96
Costel Harnasz

HIMED 96, which took place on 12-14 April at St. Martin's College, Lancaster, was superb. I can but echo the words with which Peter Ransom started his report on the Winchester HIMED two years ago (HPM *Newsletter* 34, July, 1994). In a well-balanced programme involving plenary sessions and workshops in abundance, organisers John Earle, Sue Pope and Steve Russ laid on something for everyone. The only thing they hadn't got under control was the weather: Lancaster's April breezes come directly from the Arctic.

The first day established immediately the powerfully international character of HIMED: the opening talk by our Dutch friend Jan van Maanen, a beautiful demonstration of the force and fun of mathematics down the ages, was followed by an illuminating explanation by Ma Li from Sweden of the Chinese magic square chosen as this year's conference logo. The third plenary talk that day was an after dinner tribute to the Marquis de l'Hospital, in this 300th anniversary year of his publishing the first calculus text, by our warmly welcomed American guest, Fred Rickey.

The session before dinner was an ice-breaker, of a kind we have not had at HIMED before but which proved a most happy inspiration: put a dozen relative strangers in a room together and tell them to chat to each other for an hour. The knowledge that we were all interested in mathematics and its teaching and its history provided enough

common ground that we could explore our differences in a most fruitful and supportive way which made the whole of the rest of the conference a securer and warmer place.

I won't attempt to summarize the astonishing richness and variety of the workshops, which are abstracted below.. The main customer demand, indeed, was for more workshop sessions. This would have mitigated some of the agony of choice between five or more equally attractive and unmissable sessions being scheduled, perforce, at the same time.

The stalls and exhibitions were up to the usual HIMED standards. John Bibby's bookstall was much appreciated, as always, and the HIMED T-shirt proved popular (I understand some are still available, from John Bradshaw at St Martin's). The special media sessions, one on surfing the internet, and the other showing OU videos on the history of mathematics, were both well attended.

St Martin's is a very suitable venue for a conference such as ours, not only in the quality of food and the suitability of the lecture theatre and rooms, but in the impressively vigorous way in which so many members of the St Martin's maths staff participated. It makes a lot of difference to find a home team so committed to the aims of a conference, and even the loss of head of maths Phil Gager's voice did not cut down on the energy with which he and his colleagues made us feel welcome.

The BSHM should feel proud to have organised so successful an event, and its members very grateful to the hardworking organisers who ensured so memorable a conference. A final word of thanks to conference assistant Clare who anticipated every need and was always there when you needed her to solve any one of the five dozen little problems which are always floating through a conference of this complexity.

There follow two impressions of this year's HIMED conference from people attending for the first time. The first is from a secondary school teacher and the second from a group of student-teachers from the host institution.

Impressions from the non-toxic-dry-wipe-board- marker- pen-face
Kathy Duval

I have to confess that, in teaching mathematics at secondary school level for nearly 20 years, I have hardly ever mentioned the history of the subject. I can hear your gasps of horror! Why not? Well, partly because it does not feature on the National Curriculum and partly because I do not know much about it (having never been taught it). However, I have long suspected that these two excuses are pretty feeble, so when the opportunity to attend HIMED came up, I thought I'd go along and see what I had been missing . . .

The first thing I noticed, at the reception desk, was that there was a hard core of people who were greeting each other warmly and obviously knew each other already. But this was only momentarily daunting as I was almost immediately drawn into conversation and made to feel welcome. This friendliness and readiness to talk set the tone for the whole weekend and made it a very enjoyable experience.

In the opening address, Jan van Maanen spoke about joy and conveyed the pleasure and delight he had experienced when first encountering various parts of mathematics -- something we have all experienced although we may not be able to express it so well. This speaker, like so many others, was not even addressing us in his native language; his very title, "Power without powder and joy without a stick: the force and fun of mathematics through the ages," provided him with an opportunity to relax the audience by making jokes about British perceptions of Dutch habits. For me, the concept of the joy inherent in mathematics was the

dominating feature of the whole event. There was the obvious enthusiasm which each speaker had for his subject and the pleasure with which everyone took part in the workshop sessions. It was good to see the mutual interest generated by the display of books, the bamboo models and the childrens' work. I noticed little groups of people getting together over breaks to discuss mathematical questions with obvious enjoyment. Very refreshing!

As a working teacher, whose everyday thoughts are of marking, discipline, OFSTED, absence notes &c &c &c, I really needed to be reminded of the joy of mathematics. This conference was an excellent antidote to the daily grind as well as a stimulating source of ideas for the classroom. As for the after dinner entertainment provided by TV maths impresario Johnny Ball, and metagrobologist David Singmaster, words almost fail me. All I can say is that I have not laughed so much for ages!

Mathematics + History = {Fun}
Susan Brown, Amanda Cunningham, Matthew Marshall, Chris Ramdin, Year 3/4 students, BSc (QTS) Mathematics, St Martin's College

Is Johnny Ball your hero? Well if he is, then you missed the time of your life! As newcomers to HIMED we did not know what to expect. Over the weekend there was an opportunity to attend a number of plenary lectures and workshops on different aspects of the history of mathematics. Even though there was a range in the knowledge of the listeners, everyone gained more awareness of maths history from the lectures and workshops. Coffee breaks and mealtimes enabled attenders to chat informally. The conference participants included professors, tutors, researchers, student teachers and other interested parties from eleven countries including the Netherlands, the USA and Denmark. In the gallery there was a bookstall provided by QED Books, three large cane structures based on the works of Kepler and three student-produced displays which were extremely educational!!! The catering staff excelled themselves at the conference dinner with a gorgeous three course dinner. After dinner entertainment was provided by Johnny Ball and Professor David Singmaster and we had a chance to talk to them afterwards in the Social Bar. At 1:00 am everyone left a little bit happier and more mathematically aware! By the time we left on Sunday lunchtime we had gained useful ideas for using the history of maths in the classroom, increased our knowledge of history of maths and met friendly people from a wide variety of backgrounds. It has therefore proved to our satisfaction that Mathematics + History = {Fun}.

História e Educação Matemática: Deuxième Université d'Été Européen sur Histoire et Épistémologie dan l'Éducation Mathématique; ICME-8 Satellite Meeting of the International Study Group on the Relations Between History and Pedagogy of Mathematics

General Information

From 24 to 30 July 1996 the city of Braga, in northern Portugal, will host a major international conference on mathematics education. The main purpose of this conference is to bring together mathematics teachers and educational researchers from all over the world, to share their insights and experiences in using history of mathematics in the mathematics classroom.

Braga-96 has two particular dimensions:

• It is the second European Summer University - the first was organized by the Instituts de Recherche sur l'Enseignement des Mathématiques (IREM) and held in Montpellier, France, in 1993 - which is a movement to bring together teachers from many countries

to develop their knowledge and share their experiences of history and epistemology in mathematics education.

• It is the principal quadrennial meeting of the International Study Group on the Relations Between History and Pedagogy of Mathematics. The previous one was held in Toronto, Canada, in 1992. This study group is devoted to understanding and promoting the use of history of mathematics in mathematics teaching.

The HEM Braga 96 meeting is organized by the Portuguese Associação de Professores de Matemática (APM) and by the Department of Mathematics of the University of Minho and is supported by the Portuguese Society of Mathematics and by the Rectory of the University of Minho.

PROGRAM (as of this writing)

Opening Session: Dr. F. Dias Agudo, of the Portuguese Academy of Sciences, will give a lecture on Pedro Nunes.

Introductory Lectures

Alejandro Garciadiego (Mexico): *Logic and Set Theory*
Anne Boyé (France): *Probabilités*
António Leal Duarte, Jaime Carvalho e Silva, João Filipe Queiró (Portugal): *Algumas notas sobre a História da Matemática em Portugal*
Eduardo Sebastiani Ferreira (Brazil): *A cultura matemática encontrada pelos colonizadores nas América do Sul e Central*
Eleanor Robson (UK): *From Uruk to Babylon: 4500 years of Mesopotamian mathematics*
Eliane Cousquer (France): *Histoire du concept de nombre réel*
Evelyne Barbin (France): *Historicité de la notion d'évidence en géometrie, entre évidence visuelle et évidence manipulatoire*
Frank Swetz (USA): *Using Problems from the History of Mathematics*
Florence Fasanelli (USA): *Notes on the History of Mathematics and the History of Art for the Classroom*

Fred Rickey (USA): *Greek Mathematics*
Jan van Maanen (The Netherlands): *Calculus*
Jean-Paul Guichard (France): *Qu'est-ce que l'Algèbre? Un Domaine ou un Langage?*
Jesus Hernandez (Spain): *Proof in the History of Mathematics*
John Fauvel (UK): *Computation devices*
John Fauvel (UK): *Mathematics and Music*
José Luis Montesinos Sirera (Spain): *Mathematics and Culture*
Man-Keung Siu (Hong Kong): *Mathematics in Ancient China*
P. Rajagopal (Canada): *Indian Mathematics and its Evolution*
Patrice Johan (France): *Measuring Instruments*
Paulus Gerdes (Mozambique): *History of Math in Southern Africa*
Robin J. Wilson (UK): *History of Combinatorics*
Torkil Heide (Denmark): *Non-euclidean Geometries*
Ubiratan D'Ambrosio (Brazil): *Matemáticas e técnicas*
Ubiratan D'Ambrosio (Brazil): *Mathematics in South America and Central America*
Victor J. Katz (USA): *Mathematics in Egypt*
Victor J. Katz (USA): *History of Trigonometry*
Xavier Lefort (France): *Mathematiques et Navigation: Le Traité de Pierre Bouguer de 1753*

Panels:

History of Mathematics Education, organized by Fulvia Furinghetti (Italy). Members: Charles V. Jones (USA), Gert Schubring (Germany), Harm Jan Smid (The Netherlands), Leo F. Rogers (UK), Osamu Kota (Japan).

Mathematical Proof in History, organized by Jesus Hernández (Spain) and Victor J. Katz (USA). Members: A. Durán (Spain), Evelyne Barbin (France), M. Martinez (Spain), Man-Keung Siu (Japan).

Perils and Pleasures of the Internet, organized by Jan van Maanen (The Netherlands). Members: Eleanor Robson (UK), Frederick Rickey (USA), John Fauvel (UK).

History, Research and Teaching of Mathematics, organized by Luis Radford (Canada). Members: Guillermina Waldegg (Mexico), Fulvia Furinghetti (Italy), Leo F. Rogers (UK), Michael Otte (Germany), Rudolf Bkouche (France), Victor J. Katz (USA).

Workshops:

El proyecto "Helena": una experiencia interdisciplinar de Historia de la Matematica llevada en aula, *Agustín Isidro de Lis*

Comment fonctionne la géométrie algébrique, *Alain Bernard*

Une Approche Pédagogique Deduite de l'Histoire, *Alain Bernard*

Navegações portuguesas e matemática, *Ana M. Prudêncio Vieira e Eduardo Veloso*

Uma abordagem histórico-matemática dos fundamentos do cálculo diferencial: reflexões metodológicas, *Arlete de Jesus Brito e Virgínia Cardia Cardoso*

A Geometria das Áreas, *Carlos Manuel M. Correia de Sá*

Pascal et le calcul intégral, *Claude Merker*

The history of the relation between mathematics and physics as an essential ingredient of their presentation, *Constantinos Tzanakis*

The History of Mathematics through activity based learning, *David Lingard*

Moments mécaniques d'Archimède à Poinsot, *Dominique Benard and Monique Nouet*

Teaching Mathematics in Somalia, *Franco Favilli and Jama Musse Jama*

How to treat students to conics and how to read an ancient French text at school without knowing French!, *Giuliano Testa*

Regula falsi...., *Greisy Winicki Landman*

Problemas antigos, *Isabel Cristina Dias and Maria Joao Lagarto*

O uso de exemplos com história na aula de matemática, *Jaime Carvalho e Silva*

Indian Mathematics in the Context of the Vedic Sacrifice (Sulbasütra), *Jean Michel Delire*

Chaos in the Classroom, *June Barrow-Green*

Mathematics in Ancient China, *Man-Keung Siu*

As origens do sistema de numeração decimal, *Maria Fernanda Estrada*

A resolução de equações na Álgebra de Pedro Nunes, *Mª Gertrudes Soares de Oliveira*

Using Ancient Board Games to Enhance Middle School Mathematics, *Mary Sue Houston*

Rôle de la géométrie dans la construction de l'algèbre, *Maryvonne Hallez*

History of Combinatorics, *Robin J. Wilson*

Napier's chessboard abacus, *Steve Russ*

O ensino da trigonometria baseado no Almagesto, *Maria José Mendes da Costa*

How to integrate the history of mathematics in the education of teachers: some examples., *M. G. Koen M. Pillot*

Developing mathematical ideas by exploring a weaving board, *Marcos Cherinda*

Moons, bows and barges: some Old Babylonian geometrical shapes, *Eleanor Robson*

Somando fracões no ábaco dos romanos e auxiliando os babilônios em divisões não exactas, *Nilza Eigenheer Bertoni and Leda Maria Rangearo Fiorentini*

Échanges sur des projects interdisciplinaires autour de l'histoire des mathématiques, *Caroline Dulac-Fahrenkrug, Michèle Grégoire, Maryvonne Hallez, Christine Proust*

Algorithmes numériques et géométriques pour la résolution déquations du second degré à trois termes, *Odile Kouteynikoff, Michèle Grégoire, Maryvonne Hallez*

Babylonian Mathematics in the Classroom, *Anko Haven*

Da Matemática à Música, *Oscar João Abdounur*

There will also be numerous presentations of papers.

Other Information

The meeting will be held at the University of Minho, in Braga, an old imperial Roman city, situated in the north of Portugal, in the province of Minho. The river Minho, which has given its name to the region, is the natural border between the provinces of Minho in

Portugal and Galicia in Spain. The population is slightly over one million. The climate in the region is mild and temperate; spring and autumn are very mild and pleasant; in winter the temperature rarely drops to 0°C and summers are not excessively hot. Travel and accommodation details were included in the second announcement. Most of the accommodations will be in Braga hotels; a limited number of rooms in university residences and in religious guest houses will also be available on a "first come, first served" basis.

Braga can be reached by train or taxi from Oporto (about 60 km distant). Oporto is served by daily flights from major European cities as well as from Brazil. Alternatively, one can fly to Lisbon and take one of several trains daily to Oporto and Braga. If you are coming from Seville, you can drive to Lisbon and on to Braga or take the special coach from Seville to Lisbon on July 21 and then take a train to Braga. (It is difficult to make direct train connections from Seville to Braga.)

For the latest information, check the WWW Home Page. The URL is http://www.math.uminho.pt /hem/hem-braga96.html.

ICME-8 in Seville

The Eighth International Congress on Mathematical Education will be held in Seville from July 14 to 21, 1996. There will be much of interest to readers of this *Newsletter*, including three two-hour sessions conducted by HPM itself. These sessions will have two speakers each, plus a respondent. To reflect the international character of the meeting, the nine participants will be drawn from nine different countries. The sessions will address the following themes: The History of Mathematics and Pedagogical Problems; The History of Mathematics as a Cultural Approach to Solving Problems; and Historical Problems in the Classroom. Some of the speakers will address these themes from the point of view of secondary teaching while others will deal with college level teaching. The final selection of speakers has not been made as of this writing, but these will be very exciting and stimulating sessions. There is plenty of time built into the schedule for discussion, so we invite all to attend and contribute their ideas.

In addition to the HPM sessions, Topic Group 16, History of mathematics and the teaching of mathematics, will have two ninety-minute sessions. Each of the two sessions will have a panel discussion considering one of the two following poles relative to the use of history in mathematics education: the use of history in the classroom and the use of history in mathematics education research. The principal aim is to get some perspective on how history has been used; thus the material at the sessions will be based on actual experiments and/or research.

• The use of history in the classroom: an overview of the different approaches actually experimented with; methodological implications of each approach; positive and negative aspects. Among the panelists in this session are Victor Katz (USA), John Fauvel (England), and Man Keung Siu (Hong Kong).

• The use of history in mathematics education research: fields in which history has been actually used; methodological constraints; evaluation of the effective contribution of history. Among the panelists in this session are Jena-Pierre Dorier (France), Niels Jahnke (Germany), Anna Sfard (Israel), and Maguy Schneider (Belgium).

For more information about the Topic Group, please contact Louis Charbonneau, Département de mathématiques, Université du Québec á Montréal, C. P. 8000, Succ. Centre-Ville, Montréal, QC H3C 3P8, CANADA; email: charbonneau.louis@uqam.ca.

Mathematics and Its History: A Conference at York University

A one-day conference in honor of our colleague Abe Shenitzer, on the occasion of his 75th birthday, will be held at York University on Saturday, October 5, 1996. Five distinguished speakers -- mathematicians and historians of mathematics -- will give one-hour talks. There will also be a common lunch and an evening banquet to honor Abe Shenitzer.

The speaker, their affiliations, and the titles of their talks, are: Ed Barbeau (University of Toronto), "Fourier Series"; Harold Edwards (New York University), "On the Fundamental Theorem of Algebra"; Peter Hilton (University of Central Florida), "From Geometry to Algebra: Reflections on the Birth of Homological Algebra"; Walter Littman (University of Minnesota), "The Two-way Street between Control Theory and Partial Differential Equations"; and Helena Pycior (University of Wisconsin), "George Berkeley, Mathematics and Philosophy: Berkeleian Scholarship into the 1990s".

There will be no registration fee, but we would appreciate a note (to Israel Kleiner) of your intention to come, to assist us in planning.   We would especially like to know if you will come to lunch (c. $15) and to the banquet (c. $25).   For further information, please write or call Israel Kleiner, Department of Mathematics and Statistics, York University, North York, Ontario M3J 1P3, CANADA; email: kleiner@yorku.ca; fax: 416-736-7575; tel: 416-736-5250.   For updates, including abstracts of the talks, please consult the Web site at http://www.yorku.ca/Conferences/Shenitzer.

Annual Meeting of the Canadian Society for History and Philosophy of Mathematics
Jim Tattersall

The twenty-second annual meeting of the Canadian Society for the History and Philosophy of Mathematics was held at the Learned Societies Congress at Brock University, St. Catherines, Ontario, May 30 to June 1, 1996. The President of Brock University, Dr. Terry White, hosted Society members to a wine tasting featuring selections from Niagara wineries. Transportation was provided from the university to restaurants in Port Dalhouse on the shores of Lake Ontario.

Len Berggren of Simon Fraser, organized a special session on ancient mathematics. The featured speaker at the special session was Alexander Jones from Oxford University. Professor Jones spoke eloquently and enthusiastically on Greek applied mathematics. At the same session William Anglin, Oxford University, complete with demonstrations, presented a talk entitled "Did Zhao Shuan prove the theorem of Pythagoras?" Joran Friberg from the ChalmersUniversity of Technology, Goteborg, Sweden, spoke on "From Susa to Syracuse: square roots and square root approximations in the ancient mathematical tradition." Daryn Lehoux of Toronto spoke on "The locus theorem in Pappus and   Proclus." Sam Kutler, St. John's College, related his thoughts on what Euclid hoped to accomplish with his "Elements." Jonathan Selden spoke on "Two remarks on ancient Greek geometry." Glen Van Brummelen lectured on the "Use and abuse of statistics in ancient astronomy." William Rosenthal, Michigan State, presented a joint paper with Whitney Johnson on "The reflection of early Greek mathematics in the mathematics of today." Len Berggren gave a very interesting multimedia presentation on "mathematical aspects of Ptolemy's `Geography'."

There were twenty-three speakers at the ordinary session of the society organized by Tom Drucker of Dickinson College. Erwin Kreyszig of Carleton   University gave an intriguing and informative presentation on his research on Leonard Euler as an applied mathematician and engineer. Hardy Grant, York University, shared with the audience his thoughts on the history of beauty in mathematics. Israel Kleiner, York University, presented his version of a historically focused course in abstract algebra. John Anderson, University of Toronto, spoke on "Some pearls of geometry." Abe Shenitzer, York University, shared with the audience some significant developments and turning points in   the history of mathematics.

Rebecca Adams, McMaster University gave a mathematical tour from analysis to general topology via the Borel theorem. Greg Moore, McMaster University, talked on "Cantor, Hausdorff, and the emergence of Order: 1885-1908." Fran Abeles, Kean College of New Jersey, addressed the issue of whether or not infinitesimals were numbers. Katherine Hill of the University College of Cape Breton spoke on the role of instruments in mathematical education. Evelyne Barbin, I.R.E.M., spoke on mathematics in Descartes' philosophy. Barnabas Hughes, California State University at Northridge, spoke on early voyages into logarithmic seas. Ronald Sklar, St John's University , spoke on the use of logic in automated theorem proving. Kurt Ramskov of the University of Toronto presented a paper on the emergence of mathematical institutes. William Rosenthal and Elaine Howes, of Michigan State, gave a joint presentation on "Less than Zeno." Tracy Glenn of the University of Western Ontario spoke on completeness and logic. Craig Fraser of the University of Toronto spoke on Hamilton-Jacobi mechanics and the development of Weierstrassian field theory in the calculus of variations. Chris Balthus, State University of New York - Oswego, spoke on separating the roots of a polynomial. Darcy Cutler of the University of Western Ontario, spoke on completeness and logic. Richard O'Lander of St. John's University, spoke on the history of the new mathematics. Jim Tattersall, USMA at West Point and Providence College, spoke on Davenant's problem. Ed Cohen, Ottawa, talked about Gregorian dates for the Jewish New Year and Peter Griffiths of London, England, presented his views on Fermat's Last Theorem.

On Saturday afternoon June 1, the Society sponsored a joint session with the Canadian Society for the History and Philosophy of Science.

At the business meeting plans for next summer's joint meeting with the British Society for the History of Mathematics and the twenty-third annual meeting at Memorial University, St. John's, Newfoundland, were discussed. Robert Thomas of the University of Manitoba was elected to serve a two-year term as President of the Society. Jim Tattersall was elected Vice President. Glen van Brummelen was reelected Secretary/Treasurer, and Sharon Kunoff, Jacques Lefebre, and Israel Kleiner were elected to the Council.

Joint Mathematics Meetings, January 1997

As usual, there will be many session of interest to readers of this *Newsletter* at the annual Joint Mathematics Meetings, to be held in San Diego from January 8 to January 11, 1997. There will be an AMS Special Session on the History of Mathematics, organized by Karen Parshall (University of Virginia) and Jim Tattersall (Providence College). The tentative list of speakers includes Len Berggren (Simon Fraser University), Jan Hogendijk (University of Utrecht), Joe Dauben (CUNY), Wilbur Knorr (Stanford), Greg Moore (McMaster), Tom Archibald (Acadia), Patti Hunter (University of Virginia), Victor Katz (University of the District of Columbia), Liliane Beaulieu (Montreal), Charles Curtis (University of Oregon), William Dunham (Muhlenberg), John Fauvel (Open University), Shawnee McMurran (independent scholar), Alexander Jones (University of Toronto), Catherine Goldstein (University of Paris), Paul Wolfson (West Chester), and Dan Alexander (Drake). In addition, Academic Press will be organizing a reception for historians of mathematics at the meeting, in honor of *Historia Mathematica*.

There will be an MAA Contributed Paper session on *The Uses of History in the Teaching of Mathematics*, organized by Florence Fasanelli (MAA), Victor J. Katz (UDC), and V. Frederick Rickey (Bowling Green), growing out of the NSF-supported MAA Institute on the History of Mathematics and Its Use in Teaching. To continue the themes of the Institute, which for two summers has dealt with the history of mathematics, how it can be used in the classroom, and how to teach history of mathematics courses, this contributed paper session invites contributions from individual who have taught history of mathematics in innovative ways or who have used history in their classes to support current changes in curricula, pedagogy, and the mathematical preparation of teachers. Anyone who would like to submit a proposal for this session is urged to read the submission procedures in the June, 1996 issue of *FOCUS*, the MAA Newsletter.

There will also be an MAA minicourse on the teaching of the History of Mathematics, organized by Victor J. Katz and V. Frederick Rickey. More details will appear in the October issue of *FOCUS* as well as in the next issue of this *Newsletter*.

Conference of the International History, Philosophy & Science Teaching Group

A conference of the International History, Philosophy and Science Teaching Group will be held June 21-24, 1997 in Calgary, Alberta, Canada. The Dean of the Faculty of Education, University of Calgary, Professor Ian Winchester, will be the conference chair. The conference has been initiated by the North American region, but is not limited to it. All members of the International group, and others, are invited to attend. Calgary, the site of the 1988 winter Olympics, is situated at the foot of the Canadian Rockies, near the mountain resort of Banff. The conference programme will include an optional visit to the Rockies.

International and national groups that have interests in the role of HPS in science, mathematics, and history teaching are encouraged to use the conference as an occasion to present their work and to consolidate networks.

Proposals for contributed papers, workshops, discussion groups, and exhibits of curricular and instructional materials related to the purposes of the conference are now being accepted. Due date for receipt of papers and proposals is February 15, 1997. Four copies of the proposal or paper should be sent to Ms. Linda Lentz at the address below. The proposals should include:

1.   A cover page with paper title, authors name(s), institutional affiliation, address, telephone number, FAX number, and e-mail address.

2.   A 100-150 word Abstract of each proposed paper or session.

3.   Three self-addressed envelopes.

Format: Papers should follow the format, style, and referencing conventions used in the Group's journal *Science & Education*. Please pay particular attention to form of title, author's name and address, an Abstract of 100-150 words, and referencing conventions. Disk submission is necessary - WordPerfect or Microsoft Word is preferred for PC or Mac platforms, but ASCII is acceptable. Final papers should not exceed 5000 words. They must be submitted by February 15, 1997. Early submission of proposals and final papers is encouraged in order to facilitate programming and production of Conference Proceedings.

Proposals and papers should be sent to Ms. Linda Lentz, Faculty of Education, University of Calgary, Calgary, Alberta, T2N 1N4, CANADA; email: 180118@ucdasvm1.admin.ucalgary.ca   or lentz@acs. ucalgary.ca.

Proceedings of the HPM Meeting in Blumenau, Brazil, 25-27 July, 1994

The Proceedings of the HPM meeting in Blumenau, Brazil in July, 1994 have just been published. Many of the papers presented at that meeting are included in the Proceedings, as well as a few papers whose authors were not able to attend. This is the third HPM conference in the past four years whose Proceedings have now been published. *Vita Mathematica*, published by the MAA, contains papers presented at the meetings in Toronto and Quebec in 1992. *Actes de la Première Université d'été Européenne,* published by IREM de Montpellier, includes the papers presented at the First European Summer University in Montpellier in July, 1993. It is also hoped that the proceedings of the Cairns meeting in July, 1995 will appear in the near future.

The current volume contains the following contributions:
Mariano Hormigón: "La Enseñanza de las Matemáticas in España en el siglo XIX,"
Israel Kleiner: "Paradoxes in Mathematics: History and Pedagogy,"
Charles V. Jones: "Finding Order in History Learning: Defining the History and Pedagogy of Mathematics"
Ubiratan D'Ambrosio: "   O   Futuro   da História: Algumas Preocupações Metodológicas"
Sohindar Sachdev: "African American Mathematicians and their Contributions"
Elena Ausejo: "A Enseñanza de las Matemáticas en España a Comienzos del Sigo XX: un debate para su reforma"
Clara Lúcia Higuera: "A Yupana Incaica: Elemento Histórico como Instrumento Pedagógico"
Marilyn Frankenstein: "Various Uses of History in Teaching Criticalmathematical Literacy"
Carlos Sanches: "Usos y Valores de la História de la Matemática en el Proceso de Aprendizage de los Profesionales del Tercer Milenio"
Luis Saraiva: "The First Outline in Portugal of a University Course in the History of Mathematics"
Leonel Morales: "La Aritmética Maya"
Jaime Carvalho e Silva: History of Mathematics in the Classroom: hopes, uncertainties and dangers"

Eduardo Sebastiani: "A Megade Maior do Sanduiche é minha"

Sandra Visokolkis: "Intuiciones Geométricas y Percepción Visual en la Concepción Griega de la Matemática: Ser o No Ser"

Sergio Nobre: "A difusão da matemática na Alemanha no início do século XVIII"

Erica S. Voolich: "Using Biographies to "humanize" the Mathematics Class"

Clóvis Pereira da Silva: "Desenvolvimento da Matemática no Paraná: um estudo do caso UFPR"

Luis Carolos Arboleda e Luis Cornelio Recalde: "El Ifinito Actual y Las Tecnicas de Infinito no Numerable: Una Contribución Metodológica"

Catarina Maria Vitti: "História da Matemática: Um Caminho para Recuperar o Prazer da Aprendizagem"

Denise Silva Vilela: "O Subjetivismo na Noção de Ordem na Teoria dos De Números Transfinitos de Georg Cantor"

Franklin Figoli: "The Object Orientation of Intuitive Reasoning"

Paulus Gerdes: "Examples of incorporation into mathematics education of themes belonging to the history of Geometry in Africa"

Eduardo Sebastiani: " O Ensino de Razão e Proporção via História da Matemática"

For information on obtaining a copy, contact Ubiratan D'Ambrosio, Rua Peixoto Gomide, 1771 Ap. 83, Sao Paulo - SP, BRAZIL; email: ubi@usp.br.

Jahrbuch Database Compilation

The editors-in-chief of *Mathematical Reviews* and *Zentralblatt für Mathematik*, Keith Dennis and Bernd Wagner, have agreed to cooperate on the making of a data base version of the *Jahrbuch über die Forschritte der Mathematik*. Rights to the *Jahrbuch*'s data have been granted by its publisher, Walter de Gruyter & Co. The project has been endorsed by the Board of Trustees of the American Mathematical Society and the Executive Committee of the European Mathematical Society. The technical and scientific work will be carried out at the editorial offices of the two journals, but most of the funding must be external.

The scientific enhancement of the *Jahrbuch* will depend on support from many volunteers. This short description of the project is intended to motivate research mathematicians to join the planned board of associate editors. The

tasks of these editors are discussed below.

An electronic version of the *Jahrbuch* will address the increasing need of mathematicians and historians of mathematics for quick and convenient ways to search the literature. The aim is to produce from the *Jahrbuch* a searchable database covering the mathematical literature which appeared between 1868 and 1942. Each of the 75 *Jahrbuch* volumes produced during this period covers almost all of its year's mathematical research; the total number of publications covered is estimated at 220,000. Thus the projected database would be an important tool both for mathematical research and for the history of science. Together with the databases "MATH" (based on the *Zentralblatt*, published by the Fachinformations-zentrum Karlsruhe) and "Mathsci" (based on *Mathematical Reviews*, published by the American Mathematical Society), it would make available an almost complete record of the published mathematical literature from 1868 to the present. An offline database will be provided in the form of a CD-ROM, in addition to the online service.

The *Jahrbuch* database will be structured like the two existing databases, mentioned above. The experience gained in the compilation of those predecessors will be used in the new project. In the first phase, the *Jahrbuch* material will be entered in tagged fields representing respectively author, title, volume, paging, subject, review text and reviewer. This work, which can be viewed as mechanical, will then be supplemented by intellectual review, so that the final product is a high-quality searchable database.

The project's first stage will be to store the data electronically as they appear in the *Jahrbuch*. The problem of the funding of this first stage is open, but some funds are already available for the input of data. The next stage will be to ask the associate editors to provide additional data for the individual items by classifying the articles according to the current Mathematics Subject Classification (MSC) scheme, assigning free keywords (in English) to supplement the classification, translating titles, and (if possible) adding comments. To minimize costs, it is hoped that this work can be done by volunteers. In many cases it will be a difficult task to provide correct links between the articles reviewed in the *Jahrbuch* and modern subject classification. Hence a widely diverse board of associate editors, drawn from the

ranks of research mathematicians world-wide, will be needed.

Those who are interested in serving as associate editors are asked to contact one of the following: R. Keith Dennis, *Mathematical Reviews*, 416 Fourth Street, P.O. Box 8604, Ann Arbor,   MI   48107-8604,   USA;   email: rkd@math.ams.org. or Bernd Wegner, Fachbereich Mathematik, TU Berlin, Strasse des 17. Juni 135, D - 10623 Berlin, GERMANY; email: wegner@math.tu-berlin.de.

Have You Read?
Ronald Calinger, ed.

This column welcomes references from across the history or pedagogy of mathematics, as well as other works with sections that have potential for encouraging and motivating students to learn mathematics better or that enrich courses. Please send citations with complete bibliographic information to the section editor c/o Department of History, Catholic University of America, Washington, DC 20064, U.S.A.

Artmann, Benno, "The Cloisters of Hauterive," *The Mathematical Intelligencer* 13 (2) (1991), 44 - 49.

Artmann, Benno, "Zur Geometrie gotischer Maßwerkfenster," *MU - Der Mathematikunterricht* 41 (3) (1995), 9 - 15.

Artmann, Benno, "Der Kreuzgang von Hauterive," *MU - Der Mathematikunterricht* 41 (3) (1995), 17 - 22.

Baxandall, Michael, *Shadows and Enlightenment* (New Haven: Yale University Press, 1995).

Bennett, J., ed., *The Measurers: A Flemish Image of Mathematics in the Sixteenth Century* (Oxford: Museum of the History of Science, 1995).

Beretta, Marco, *The Scientific Messenger and the Polar Star: Scientific Relations between Italy and Sweden from 1500 to 1800* (Uppsala Studies in the History of Science, Vol. 22) (Prato, Italy: Giunti, 1995).

Blackmore, John, ed., *Ludwig Boltzmann: His Later Life and Philosophy, 1900 - 1906* (Dordrecht: Kluwer Academic Publishing, 1995).

Brackenridge, J. Bruce, *The Key to Newton's Dynamics: The Kepler Problem and the Principia*, Mary Ann Rossi, trans. (Berkeley: The University of California Press, 1995).

Calinger, Ronald, "Leonhard Euler: The First St. Petersburg Years (1727 - 1741)," *Historia Mathematica* 23 (1996), 121 - 167.

Calinger, Ronald, ed., *Vita Mathematica: Historical Research and Integration with Teaching* (Washington: The Mathematical Association of America, 1996), MAA *Notes*, No. 40.

Gent, R. H. van, *The Portable Universe: Two Astrolabes of the Museum Boerhaave* (Leiden: Museum Boerhaave, 1994).

Graebenteich, Andrea, "Geometrische Muster in Kirchenfenstern," *MU - Der Mathematikunterricht* 41 (3) (1995), 41 - 60.

Henderson, Harry, *Modern Mathematicians* (New York: Facts on File, 1996).

Hoare, G. and Lord, N., "Stefan Banach (1892 - 1945): A Commemoration of His Life and Work," *The Mathematical Gazette* 79/486 (1995), 456 - 470.

Holvoet, R., E. Dickson, Pionir van de Amerikanse Wiskunde," *Wiskunde en Onderwijs* 21 (1995), 145 - 155.

Kindinger, Klaus: "Eine geometrische Analyse gotischer Maßwerkfenster," *MU - Der Mathematikunterricht* 41 (3) (1995), 23 - 39.

Knauff, Robert E., *Short Stories from the History of Mathematics* (Burlington, N.C.: Carolina Biological Supply Co., 1996).

Lorch, Richard, *Arabic Mathematical Sciences: Instruments, Texts, Transmission* (Brookfield, Vt.: Variorum, 1995).

Mancosu, Paolo, *The Philosophy of Mathematics and Mathematical Practice in the Seventeenth Century* (Oxford: Oxford University Press, 1996).

Meskens, A., "Een Proportionaalpasser van Gillis Coignet?" *Wiskunde en Onderwijs* 21 (1995), 166 - 176.

Ronan, Colin A., *The Shorter Science and Civilization in China: An Abridgement of Joseph Needham's Original Text*, Vol. 5 (Cambridge: Cambridge University Press, 1995).

Schmidt, Guenter, "Mathematik kommt vor," *MU - Der Mathematikunterricht* 41 (3) (1995), 61 - 74.

Segre, Emilio, *Enrico Fermi: Physicist* (Chicago: University of Chicago Press, 1995).

Sepper, Dennis L., *Descartes's Imagination: Proportion, Images, and the Activity of Thinking* (Berkeley: University of California Press, 1996).

Thackeray, Arnold, ed., *Constructing Knowledge in the History of Science* (*Osiris*, vol. 10) (Chicago: University of Chicago Press, 1995).

Wright, M. R., *Cosmology in Antiquity* (New York: Routledge, 1995).

Wertheim, Margaret, *Pythagoras' Trousers* (New York: Times Books, 1995).

Distributors:

U.S.: Editorial Office

Canada: Thomas Archibald (Mathematics Department, Acadia University, Wolfville, NS B0P 1X0)

Mexico: Alejandro Garciadiego (UNAM - contact at José M. Velasco 71, Del. Benito Juárez, 03900 Mexico, D.F.)

South America: Geraldo Pompeu, Jr. (Departamento de Matemática, PUCCAMP/Campus I, s/n 112 km, Rodovia SP 340, 13100 Campinas SP, Brazil)

Australia: George Booker (Faculty of Education, Griffith University, Brisbane, Queensland 4111)

New Zealand: Andy Begg (SMER Centre, University of Waikato, Private Bag 3105, Hamilton)

United Kingdom: John Fauvel (Maths Faculty, Open University, Milton Keynes MK7 6AA)

France: Evelyne Barbin (IREM, Université Paris VII, Tour 56/55 - 3e étage, 2, Place Jussieu, 75251 Paris Cedex 05)

Austria: Manfred Kronfellner (Institut für Algebra und Diskrete Mathematik, Technische Universität Wien, Wiedner Hauptstr. 8-10/118, A-1040 Wien)

Germany and Eastern Europe: Roland Stowasser (Technische Universität Berlin, Straße des 17. Juni 136, 1000 Berlin 12, Germany)

Belgium and the Netherlands: Jan van Maanen (Rijksuniversiteit Groningen, Department of Mathematics, P.O. Box 800, 9700 AV Groningen, The Netherlands)

Scandinavia: Bengt Johansson (Institutionen för ämnesdidaktik, Göteborgs universiteit, Box 1010, S-431 26 Mölndal, Sweden)

Spain and Portugal: Eduardo Veloso (Associaçáo de Professores de Matemática, Escola Superior de Educação Matemática, Rua Carolina Michaelis de Vasconcelos, 1500 Lisboa, Portugal)

Italy: Luciana Bazzini (Departimento di Matematica, Università de Pavia, Via Abbiategrasso 209, 27100 Pavia)

Greece, Turkey and the Balkans: Nikos Kastanis (Department of Mathematics, Faculty of Sciences, Aristotle University of Thessaloniki, 54006 Thessaloniki, Greece)

Israel: Ted Eisenberg (Mathematics Department, Ben Gurion University of the Negev, Beersheva 84105)

Iran: Mohammad Bagheri (P.O. Box 13145-1785, Teheran)

South Asia: R. C. Gupta (Ganita Bharati Academy, Ras Bahar Colony, P.O. Lahar Gird, Jhansi 284 003, India)

Japan: Osamu Kota (3-8-3 Kajiwara, Kamakura-shi, Kanagawa-ken 247)

Malaysia: Mohini Mohamed (Dept. of Science and Technological Education, Universiti Teknologi Malaysia, Karung Berkunci 791, 80990 Johor Bahru, Johor)

Other East Asia: Gloria Benigno (Department of Education, Culture & Sports, Division of Camiguin, Mambajao, Philippines)

Morocco: Abdellah El Idrissi (ENS, BP S-41, Marrakech)

Southern Africa: Paulus Gerdes (C. P. 915, Maputo, Mozambique)

Other Africa: J. O. C. Ezeilo (National Mathematical Centre, Private Mail Bag 118, Abuja, Nigeria)

Elsewhere: U.S. Editorial Office.