

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

AN AFFILIATE OF THE INTERNATIONAL COMMISSION ON MATHEMATICS INSTRUCTION

No. 44

August 1998

## Calendar

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1998 August 17-21 Chungbuk, Korea  
The first ICMI-East Asia Regional Conference on  
Mathematics Education (ICMI EARCOME I) will  
be held at the Korea National University of

Education, Republic of Korea, from August 17  
through August 21, 1998. The themes of ICMI-  
EARCOME I are: Technology and Mathematics  
Education, Comparative Study on Mathematics  
Education, History and Pedagogy of Mathematics,  
Mathematics and Society, Mathematics Education in  
Primary School, Secondary School and University,  
Teacher Training, Gifted Education. The program  
will include Invited Lectures, working Groups and  
Topic Groups. In each Group, keynote speeches and  
paper presentations will be given. Abstracts and  
recommendations will also be proposed. Exhibitions  
of textbooks, computer softwares and other types of  
material are being planned as well. The conference  
languages will be English and Korean. But all oral  
presentations in Korean will be translated into  
English.

For more information about ICMI-  
EARCOME I please contact: Professor Hyunyoung  
Shin, Department of Mathematics Education, 363-  
791, Korea; tel: 82-431-230-3721; fax: 82-431-233-  
3256; e-mail: shin@knucc-sun.knu.ac.kr.

1998 August 18-27 Berlin, Germany  
The International Congress of Mathematicians will  
this time take place in Berlin, Germany. There will  
be Invited Lectures in 19 sections, one of which is  
the History of Mathematics.

1998 October 9 London, UK  
A one day symposium on the History of  
Biomathematics and Biostatistics will be held at the  
Wellcome Institute for the History of Medicine, in  
the Auditorium of the Wellcome Building, 183  
Euston Road, London NW1. For information,  
contact Frieda Houser, tel 0171-611-8619/ fax

1998 October 2-December 13 **Antwerp, Belgium**  
Exhibition, *Familia Universalis Coignet*, in cooperation with the Flemish Science Week. For more information see this Newsletter.

1999 May 30- June 4 **Manila, Philippines**  
8th Southeast Conference on Mathematics Education (SEACME-8) The theme is: Mathematics for the 21st century. The conference will cover topics such as:

Mathematics content in elementary, secondary and tertiary level schools; Teaching approaches and methods for the next century; Assessment Methods, Mathematics for special groups; Mathematics in the workplace; Educational technology; Alternate delivery systems; Mathematical modeling. The contact persons are Milagros Ibe, Chair and Catherine Vistro-Yu, Secretary. All proposals should be sent to:

SEACME-8 Secretariat, Mathematics Department, Ateneo de Manila University, Loyola Heights, Quezon City 1108, P.O.Box 154, Manila 0917, Philippines.

Information is also available on the web page <http://www.math.adm.Edu.Ph./seacme8/seacme.html>.

1999 September 18-19 **Oxford, UK**  
A two day residential meeting will be held with the topic *Medieval Mathematics* at Kellogg College, Oxford. Organizers are Raymond Flood ([raymond.flood@conted.ox.ac.uk](mailto:raymond.flood@conted.ox.ac.uk)) and Eleanor Robson ([eleanor.robson@wolfson.ox.ac.uk](mailto:eleanor.robson@wolfson.ox.ac.uk)).

2000 July 31- August 6 **Tokyo, Japan**  
The 9th International Congress on Mathematics Education (ICME 9) will be held in Tokyo/Makuhari. Makuhari is located between the center of Tokyo and Tokyo International Airport. Chairperson for the International Program Committee is Prof. Hiroshi Fujita. Major Events include a Plenary Lectures, International Round Table, Regular lectures, Working Group for Action, Topic Study Group, Poster Presentation, ICMI Study Group, ICMI General Assembly, Social Activities and Exhibitions. For information, contact Prof. Toshio Sawada, Department of Mathematics, Science University of Tokyo, 26 Wakamiya, Shinjuku-ku, Tokyo 162-0827, Japan.

#### Coignet exhibition at Antwerp

An exhibition, entitled *FAMILIA UNIVERSALIS COIGNET*, about the Coignet family will be held in the Koninklijk Museum voor Schone Kunsten (Royal Fine Arts Museum) at Antwerp from 2 October to 13 December 1998, in cooperation and with the support of the Flemish Science Week.

The Coignet family was a sixteenth century Antwerp family, which counted among its members painters, physicians and scientists. Work of art by all members of the family will be shown. The exhibition consists of three parts: paintings and etchings by Gillis I, Michiel II and Gillis II; scientific instruments (i.e. sundials, nocturlabes, Holland circles ...), scientific books and manuscripts by Gillis Sr. and Michiel I; and an educational part in which students can use replica's of scientific instruments.

A lavishly illustrated 220 page book about the family and especially the mathematician Michiel I accompanying the exhibition will be published in Dutch, but an English translation of the text is also provided. Book plus translation costs 600 BFR (incl. p&p; excl. bank transfer costs) and can be ordered at the Koninklijk Museum voor Schone Kunsten, Plaatsnijderstraat 2, 2000 Antwerp.

Entrance (including the permanent collection): adults 150 BFR; groups, OAP's, students 120 BFR; secondary school students: free. On Fridays the museum charges no entrance fees. Information: +32-3-2387809

#### HPM meeting in Lorena, Brazil

Between two great congresses in Brazil: VI Brazilian National Meeting of Mathematics Education (20th to 24th July - city of Sao Leopoldo - near Porto Alegre, south of the country) and V Latin-American Congress of History of Science and Technology (28th to 31th July - city of Rio de Janeiro), in the small city of LORENA (between Sao Paulo City and Rio de Janeiro City) a meeting of The International Study Group on the Relations Between History and Pedagogy of Mathematics was held on the 26th and 27th of July, 1998. Organizer was the Brazilian Committee of History of Mathematics.

For information:

Sergio Nobre

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## Institute in the History of Mathematics and Its Use in Teaching

Victor Katz

Forty-eight college faculty members and eighteen high school teachers gathered at the Catholic University of America in Washington, DC in the last two weeks of July as part of the fourth summer session of the Institute in the History of Mathematics and Its Use in Teaching (IHMT). Their presence was supported by two grants to the Mathematical Association of America by the National Science Foundation. The "novice" college faculty, in a project led by Fred Rickey and Victor Katz, studied the history of algebra, geometry, and calculus, had seminars in using history in the teaching of mathematics, discussed how to teach courses in the history of mathematics; heard Ron Calinger discuss historiography; and attended special lectures by Marcia Ascher on Ethnomathematics; Judy Grabiner on Maclaurin and the Molasses Barrels, Steven Schot on the Geometrical Meaning of the Third Derivative; Kim Plofker on Indian Mathematics and Astronomy, and Florence Fasanelli on the History of Art and the History of Mathematics. These faculty members will all conduct research projects in the history of mathematics before returning to Catholic University next summer to continue their study of the history of mathematics and its use in the teaching of mathematics.

Ten "veteran" college faculty members attended advanced seminars in the history of mathematics, led by Marcia Ascher, Judy Grabiner, Steven Schot, and Kim Plofker. They also participated in the preparation of historical modules to be used in either college or high school classrooms for teaching mathematics.

Six of the veterans worked with the high school teachers, who were involved in a project led by Victor Katz and Karen Dee Michalowicz. The high school teachers, besides studying the history of algebra, geometry, and calculus and attending several special lectures, spent much of their time developing modules specifically designed for the high school classroom. The six writing teams made substantial progress in developing modules on trigonometry, exponentials and logarithms, proof in geometry, linear equations, negative numbers, and combinatorics. The teams will continue to work on these modules during the coming academic year and will pilot test them either in the fall or spring. They will then return to Washington next summer to

complete work on them before large scale field testing begins in the fall. The returning teachers will also study more history of mathematics as well as begin new modules next summer.

Given that there is a need for close to one hundred field test teachers for these historical modules, we urge high school teachers reading this Newsletter to apply to participate in the field test program. Some of the field testers will be able to come to Washington next summer for intensive professional development sessions on history and, in particular, the use of these modules. Others will get written materials to help them prepare to use the modules. If you are interested, please contact either Victor Katz ([vkatz@maa.org](mailto:vkatz@maa.org)) or Karen Dee Michalowicz ([KarenDM@aol.com](mailto:KarenDM@aol.com)) no later than February 1, 1999. You can also write to either one care of the Mathematical Association of America, 1529 18th St. N.W., Washington, DC 20036.

## HPM Conference Within a Conference at NCTM, Washington, DC

Victor Katz and Erica Voolich

The Americas Section of HPM held an all-day conference on "The Use of the History of Mathematics in Mathematics Teaching" at the Annual Convention of the National Council of Teachers of Mathematics on 4 April, 1998 in Washington, DC.

Arthur Johnson gave the opening remarks. "Why History of Mathematics in Mathematics Classes?" He spoke of how mathematics history could be used to dispel such myths as math is static, one-dimensional, ready-made, error-free, never changing, and only for boys. He talked about why one would use mathematics history. Some examples he gave were humanizing math, showing the development of mathematics, looking at the roles of math in society and of society in math, portraying mathematicians as real people, showing the interdisciplinary nature of math, and making multi-cultural connections. He presented some ideas on how to incorporate math history into the classroom. You can share the history of notation, share quotations by and about mathematicians, tell amusing anecdotes, introduce new topics historically, look at historical problems, and consider interdisciplinary and multi-cultural connections.

The morning sessions designed for middle-school teachers included one by Erica Voelch entitled "Around the World on Hamiltonian Paths and Circuits," and one by Karen Dee Michalowicz on "Using Ancient Algorithms in Teaching Middle School Math." Both of these sessions included lots of hands-on material which teachers will be able to use with their own students. In a session designed for high school teachers, Eleanor Robson discussed using "Old-Babylonian Geometry in Today's Geometry Class." She showed the teachers various interesting geometrical problems found on Babylonian tablets, demonstrated how one analyzes the problems and their solutions, and showed how to use these materials in classes. Don Barry also spoke on "Using the History of Mathematics as a Source of Problems in High School," by concentrating on one particular problem with many ramifications.

The college session included Pat Allaire's talk on "Teaching Introductory College Mathematics Through History," Fred Rickey's talk on "Using History in Beginning Calculus," and David Kullinan's talks on "Precalculus Using History." Each of these talks demonstrated that it is imperative to use history at whatever level one teaches and showed explicitly how to do that in various situations.

The afternoon sessions included two sessions on Chinese mathematics. Frank Swetz spoke on "The Yin and the Yang of Chinese Mathematics." The most significant developments in Chinese mathematics date from the Han (206 BCE -220 CE), the Late Song (1127-1279) and the Yuan (1279-1368). From the seventeenth century, the Chinese mathematics was influenced by Western mathematical thinking. The Chinese developed a decimal numeration system that included fractions. They had algorithms for calculations that included extraction of square and cube roots and solutions for systems of equations. Their approach to algebra was geometric. The Yin and Yang are a polarity of forces that is reflected in a variety of ways. The Luoshu is more than just a magic square, it embodies a philosophy. Swetz shared methods of writing and computing with rod numerals, hexagrams, the Luoshu and some geometric algebra problems in his workshop.

Philip Straffin dealt with the "Geometry of Liu Hui." Liu Hui was Chinese mathematical genius

in the third century who wrote a Commentary on the Nine Chapters of the Mathematical Art and also wrote the Sea Island Mathematical Manual. Straffin shared some methods of Liu Hui's achievements: his justification of the square root algorithm, his dissection argument for the Pythagorean theorem, his calculation of  $\pi$ , his derivation of the volume of pyramidal shapes and his computation of the volume of a sphere. Much of Straffin's workshop was published in *Mathematics Magazine* (June, 1998) in "Liu Hui and the First Golden Age of Chinese Mathematics."

Two speakers also shared an afternoon session on African Mathematics. The first speaker was Paulus Gerdes, whose topic was "Exploring Geometrical ideas from Southern Africa." Gerdes used pictures of numerous artifacts from Southern Africa, both from long ago and from recent times, to show how geometrical ideas are imbedded in the works of craftsmen and artisans. He also discussed ways of using these ideas in today's classes. Many of the activities he demonstrated will appear in print in a forthcoming book to be published by the Mathematical Association of America. Beatrice Lumpkin then discussed a few "Mathematical Gems from Egypt," mostly ideas which are not discussed in current texts. These included the notion of a zero and the idea of a graph.

A final afternoon session featured Florence Fasanelli speaking on "The Use of the Intertwining of the History of Mathematics and the History of Art in the Classroom." This talk, amply illustrated with slides of paintings and sculptures, showed the influence of such mathematical ideas as the fourth dimension and non-Euclidean geometry on the work of nineteenth and twentieth century artists. The concluding session was Victor Katz's talk on "Algebra in Islam," in which he discussed many of the contributions of Islamic mathematicians to our understanding of algebra and showed how these ideas could be included in current algebra classes.

Comments about the all day Conference within a Conference were generally positive with many people expressing disappointment that they could only attend a few of the sessions. Although IIPM will not be able to conduct another CWaC at the San Francisco meeting in April, 1999, it is hoped that we can conduct long sessions in history at future annual meetings of the NCTM. The San Francisco

meeting will, however, have a three hour session on using history in the elementary school classroom, conducted by Florence Fasanelli, as well as various other sessions on the history of mathematics and its use in the classroom.

#### **A paper by Ivor Grattan-Guinness**

Gerard Boskes

In *Zentralblatt für Didaktik der Mathematik* (International Reviews on Mathematical Education) first issue 1998, pages 12-18, we find the article *Some neglected Niches in the Understanding and Teaching of Numbers and Number Systems* by Ivor Grattan Guinness. The abstract of the paper reads as follows.

*Cultural questions have attended arithmetic since it began to develop in ancient times. They include possible differences between integers and non-integral numbers and in operating with them, religious and mystical uses and interpretations, the role of zero, extensions to infinite numbers, and representing numbers by numerals in ways which aid calculation (including the use of algebra). The selection of historical examples given here concentrates on aspects of numbers, which are not well understood but which could be used in teaching, either at school or undergraduate level. Comments on educational utility are given, mostly at the end of each section.*

The section headers are the following:

1. Ancient number things
2. Integers with properties
3. Algebra within and beyond arithmetic
4. Number systems and calculation
5. The logic and set theory of arithmetic
6. Transfinite arithmetic
7. Much ado about zero
8. Formalisms and incompleteness
9. References and further reading

For more information we refer the reader to this interesting paper.

8th SouthEast Asian Conference on Mathematics Education 30 May - 4 June 1999 Manila

**MATHEMATICS for the 21st CENTURY  
CALL FOR PAPERS**

This is an announcement that we are still accepting proposals for presentations at the Conference. Research papers, demonstrations, reviews and project reports are welcome. Proposals for workshops and poster and materials exhibits are also accepted. The conference will cover topics such as

*mathematics content in elementary, secondary and tertiary level schools*  
*teaching approaches and methods for the next century*  
*assessment methods*  
*mathematics for special groups*  
*mathematics in the workplace*  
*educational technology*  
*alternate delivery systems*  
*mathematical modeling*

All proposals should be sent to  
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Loyola Heights, Quezon City 1108  
P.O. Box 154, Manila 0917  
PHILIPPINES

Contact Person:  
Milagros Ibe, Chair

**Have You Read?**  
Ronald Calinger, ed

This column seeks references from across the history and historiography of mathematics, the pedagogy of mathematics, and the sociology of mathematics. It also attempts to cite books or articles, containing sections on these subjects that have the potential for encouraging and motivating students, along with possibly improving the learning of mathematics and research in it, or that may 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.

Bennett, Deborah J., *Randomness*, Cambridge, Mass.: Harvard University Press, 1998, x+238 pp. \$22.95

Berggren, J. Lewnat, *Mathematics and her Sisters in Medieval Islam*, *Historia Mathematica* 24, 1997, 407-440

- Bezuska, Stanley J. And Kenney, Margaret J., *Even Perfect Numbers (Update)*, *The Mathematics Teacher* 90, 1997, 628-633.
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- David, F.N., *Games, Gods and Gambling: A History of Probability and Statistical Ideas*, New York: Dover Publications, 1998, xvi + 276 pp., \$9.95
- Debus, Allen G. and Walton, Michael T., eds., *Reading the Book of Nature: The Other Side of the Scientific Revolution*, Kirksville, Mo.: Sixteenth Century Journal Publishers, 1998, xvi + 280 pp., \$45.
- Fowler, David, *IN MEMORIAM: Wilbur Richard Knorr (1945-1997) An Appreciation*, *Historia Mathematica* 25, 1998, 123-132
- Garber, Daniel and Ayers, Michael, eds., *The Cambridge History of Seventeenth Century Philosophy*, 2 Volumes, Cambridge: Cambridge University Press, 1998, vii + 1616 pp., \$175
- Halmos, Paul and Givant, Stephen, *Logic as Algebra*, Washington D.C., The Mathematical Association of America, 1998, x + 142 pp., \$27
- Maz'ya, Vladimir and Shaposhnikova, Tatanaya, *Jacques Hadamard. A Universal Mathematician*, Providence, R.I., American Mathematical Society, 1998, *History of mathematics*, Vol. 14, xxvi + 574 pp., \$79.
- Pay, Michael, *D'Alembert, ou la Raison Physicomathématique au Siècle des Lumières*, Paris, Les Belles Lettres, *Figures du Savoir*, vol. 8, 208 pp., Fr39.
- Rodis-Lewis, Geneviève, *Descartes His Life and Thought*, Trans. by Jane Marie Todd, Ithaca, N.Y., Cornell University Press, 1998, 264 pp., \$39.95
- Schubring, Gert, *Analysis of Historical Textbooks in Mathematics*, Lecture Notes, Rio de Janeiro: Pontifícia Universidade Católica, 1997, Telefax (021) 259-5495.
- Sokomon, Julie Robin, *Objectivity in the Making: Francis Bacon and the Politics of Inquiry*, Baltimore, Johns Hopkins University Press, 1998, xxii + 322 pp., \$49.95
- Swerdlow, Noel M., *The Babylonian Theory of the Planets*, Princeton University Press, 1998, xviii + 246 pp., \$39.50
- Wilson, Robert, *Astronomy through the Ages: The Story of the Human Attempts to Understand the Universe*, Princeton University Press, 1997, xvi + 302pp., \$29.95
- Yates, David, *Turing's Legacy. A History of computing of the National Physical Laboratory 1945-1995*, London, National Museum of Science and Industries, 1997, 348pp.
- Zagorn, Perez, *Francis Bacon*, Princeton University Press, 1998, xvi + 288pp., \$29.95

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. It is edited in the Department of Mathematics, University of Mississippi, University, MS 38677, U.S.A. and printed and mailed with funds supplied by the University of Mississippi and other educational establishments around the world. The Newsletter is free of charge upon request and may be reproduced with acknowledgment.

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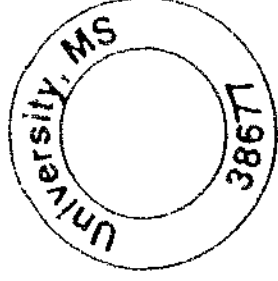
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