International Study Group on the Relations Between the HISTORY and PEDAGOGY of MATHEMATICS
An Affiliate of the International Commission on Mathematical Instruction

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(the online and on time version of this newsletter).

The Hans Freudenthal Medal for 2011 goes to LUIS RADFORD (Université Laurentienne, Sudbury, Canada)

It is with great pleasure that the ICMI Awards Committee hereby announces that the Hans Freudenthal Medal for 2011 is given to Professor Luis Radford, Université Laurentienne, Canada, in recognition of the theoretically well-conceived and highly coherent research programme that he initiated and has brought to fruition over the past two decades, and which has had a significant impact on the community. His development of a semiotic-cultural theory of learning, rooted in his interest in the history of mathematics, has drawn on epistemology, semiotics, anthropology, psychology, and philosophy, and has been anchored in detailed observations of students' algebraic activity in class. His research, which has already garnered several awards, has been documented extensively in a vast number of highly renowned scientific journals and specialized books and handbooks, as well as in numerous invited keynote presentations at international conferences. The impact of Luis Radford's programme of research has been felt especially by the community of research in algebra teaching and learning where his

theoretical and empirical work has led to significant new insights in this domain, and more broadly by the entire community of mathematics education research with his development of a groundbreaking, widely applicable theory of learning.

Further evidence of the impact of Luis Radford's work can be found in the many mentoring workshops for graduate students he has been invited to give in several countries that include Italy, Spain, Denmark, Colombia, Mexico, and Brazil. As well, he has influenced teachers, teacher educators, curriculum developers, and representatives of ministries of education at the regional and national levels by his seminars on the implications of his research. His scholarly work has also led to prestigious invitations at the international level, such as his participation in the scientific programme of the Symposium for the ICMI Centennial "The First Century of the International Commission on Mathematical Instruction (1908-2008): Reflecting and Shaping the World of Mathematics Education" in Rome in 2008. In addition, he has served as associate editor of For the Learning of Mathematics *and is currently an associate editor of* Educational Studies in Mathematics.

Luis Radford graduated from the Universidad de San Carlos in Guatemala in 1977 with a degree in Civil Engineering. He then taught at that university's Engineering School in the Department of Mathematics from 1978 to 1980. This was followed by studies at Université Louis Pasteur I, Strasbourg, France, where Luis Radford obtained a *Licence* in Mathematics and Fundamental Applications in 1981, a *Diplôme* of Advanced Studies in Mathematical Didactics in 1983, and a *Doctorat de troisième cycle* in Mathematical Didactics in 1985. He then returned to Guatemala where he taught as an Associate Professor at the Universidad de San Carlos in the Humanities Faculty. In 1992, he moved to Canada where he obtained a position in the School of Education at Université Laurentienne, Sudbury, Ontario, at the rank of Full Professor.

The beginnings of Luis Radford's research programme, and the theoretical depth that was to characterize all of his work, can be traced back to the early 1990s when he initiated a study that examined the role of historical-epistemological analyses of learning within a socio-cultural perspective, and which he described in "On psychology, historical epistemology, and the teaching of mathematics: Towards a socio-cultural history of mathematics" (1997, in *For the Learning of Mathematics*). His work continued to evolve during the late 1990s, when he drew upon the works of Vygotsky, Bakhtin, and Voloshinov to develop a semiotic-cultural framework, a framework that was used to investigate the ways in which students use signs and endow them with meaning in their initial encounters with algebraic generalization of patterns. The journal article that is his most highly cited thus far, and which described the results of that particular phase of his research programme, is "Gestures, speech, and the sprouting of signs: A semiotic-cultural approach to students' types of generalization" (2003, in *Mathematical Thinking and Learning*). The further development of his semiotic-cultural theory of learning is revealed in more recent papers where, for example, he elaborated the notion that thinking is a sensuous and sign-mediated reflective activity embodied in the corporeality of actions, gestures, and artifacts (2010, in *Research in Mathematics Education*) and in a chapter in which he formulated

learning as a process where knowing and being are mutually constitutive (2008, in *Semiotics in Mathematics Education*). Luis Radford's more than 170 publications, many of them highly cited, attest not only to the prolific nature of his research activity but also to the international interest it has attracted.

Luis Radford's research was awarded the Université Laurentienne 2004-05 Research Excellence award. He was also nominated for the prestigious Gold Medal of the Social Sciences and Humanities Research Council of Canada in 2005. His research programme was ranked first in three consecutive competitions of the Social Sciences and Humanities Research Council of Canada (Education 1): 2004-2007, 2007-2010, and 2010-2013.

In summary, Luis Radford is an eminently worthy recipient of the Hans Freudenthal Medal 2011.

(Text and image obtained from the ICMI website: http://www.mathunion.org/icmi/icmi/news/details/?tx_ttnews%5Btt_news%5D=801&cHash=9f09d8ef9ae6d4393f2ffb6efdea781b)

Request for Information

Greetings HPM Colleagues!

I have been asked to write a "penultimate chapter" (for the forthcoming two-volume *International Handbook of Research in History and Philosophy for Science and Mathematics Teaching*) on the ways in which the history and pedagogy of mathematics occurs in mathematics teacher training around the world (and, for mathematics teacher training at any level, say pupils aged 5 to 18). Although I am using published articles (e.g., through *Educational Studies in Mathematics* and other international journals, CERME papers) to locate studies that have been conducted with teacher candidates, I only have the ICMI study from 2000 (Fauvel and van Maanen) to refer to what may be formally (and informally) mandated in such programs around the world.

And, so, here is my request:

Could you briefly describe for me the ways in which history or philosophy of mathematics is included (mandated? required?) in the preparation of mathematics teachers in your country? Is it significantly different than what was reported in the 2000 study? Or, have there been developments that I should capture as part of this chapter? Alternatively, if there is a particular person I could write who has published on this topic, could you please direct me to them?

If you could please me (kclark@fsu.edu) with the information specific to your country and context by 20 March 2012, I would be most appreciative!

Thank you!

Kathy Clark
(Florida State University
Tallahassee, Florida USA)

Mathematical and cultural connections in ancient mathematics: The case of bow-figure

The recent excellent book by Jöran Friberg (see References at the end) clearly exposes some significant connections between mathematics of ancient Egypt and Babylonia. Earlier the cultural unity of the popular antique Surveyor's Rule

$$Area = \frac{1}{2}(a+c)\cdot\frac{1}{2}(b+d) \quad (1)$$

for the area of a quadrilateral of sides *a*, *b*, *c*, *d*, has been well illustrated by the present author (Gupta, 2002). The case of the bow-figure (circular segment up to the semicircle) is discussed in this article.

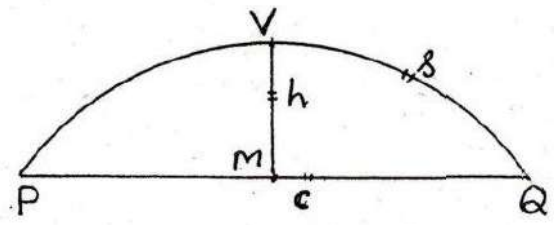

Fig. 1

Let a segment (Fig. 1) of a circle (of diameter $d = 2r$) be bounded by the chord *PQ* (of length *c*) and arc *PVQ* (of length s). Let *h* be the length of the arrow *VM* which is usually called the height of the segment. The exact formula

$$c^2 = 4h(d-h) \quad (2)$$

can be found by using the so-called theorem of Pythagoras in the triangle obtained by joining the midpoint *M* and *P* (or *Q*) to the centre of the circle and was known in ancient times. Given *c* and *h*, the segment is uniquely defined and *d* can be found from (2). Here we will describe some empirical rules for finding the arc *s* and the area of the segment as used in various ancient cultural regions. Such rules continued to be used in practical geometry for quick and approximate mensuration even once trigonometry became available and yielded better results.

For rectification of the arc *s*, the Babylonians used the simple empirical formula

$$s = c + h \quad (3)$$

and was discovered by the present author (2001) from the calculations mentioned in the mathematical text *BM85194*, which is dated about 1600 BCE. There are claims that this Babylonian text used (3) to find *h* from the given $s = 60$ and $c = 50$.

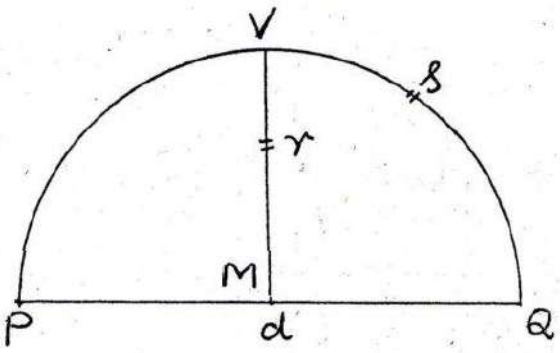

Fig. 2

According to the Old Babylonian (about 1800 to 1600 BC) table of constants, the relation between the circumference *C* and the transversal or diameter *d* of a circle was

$$C = 3d \quad (4)$$

which obviously implies the simple approximation $\pi = 3$. For a semicircular arc, the expression $(3/2)d$ is found in *BM85210*. Thus the length of the arc *s* of the semicircle (Fig. 2) takes the form

$$s = d + r \quad (5)$$

or

$$\text{arc } PVQ = (\text{base } PQ) + (\text{cross-line } VM) \quad (6)$$

This relation was used in the ancient Greek mathematical text *P. Vindob G. 26740* (about 3rd century BCE) to find *s* (from *PQ* = 30 and *VM* = 15) and then the rule

$$\text{Area} = \frac{s^2}{3} \quad (7)$$

was applied to find the area of the full circle. Note that (7) comes from the antique rule

$$\text{Area} = \frac{C^2}{12} \quad (8)$$

which was popular in Old Babylonian texts, e. g., *YBC7302* and *YBC11120* (and, of course, $C = 2s$).

The ancient Babylonians treated the segment in analogy to the semicircle with which the former resembles. Due to this similarity, the relation (6) was interpreted and applied analogously to the segment (Fig. 1) thereby resulting in (3).

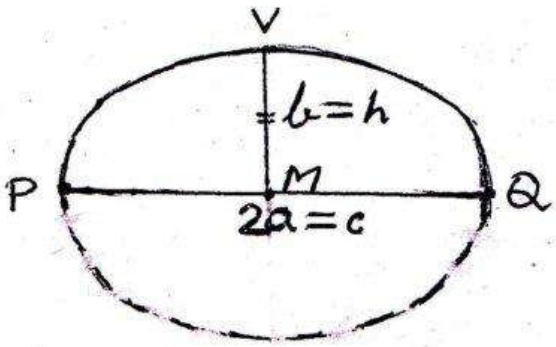

Fig. 3

A tradition similar to (3) is found in a peculiar case in India. Mahāvīra in his *Gaṇitasāra-saṅgraha* VII.21 (about 850 CE) roughly rectifies the elongated circle (or ellipse of axes 2*a* and 2*b*) (Fig. 3) by treating it as a double circular segment. The *Gaṇitasāra-kaumudī* III.49 of Thakkura Pherū (about 1300 CE) gives equivalent of (3) in the form

$$c = \sqrt{4\left(s - \frac{s+h}{2}\right)^2} \quad (9)$$

which is, otherwise, simply $c = s - h$.

A significant use of (3) is in providing an easy derivation of the ancient simple formula

$$A = (c + h) \cdot h/2 \quad (10)$$

for the area of the segment. The derivation uses the rule

$$A_0 = \frac{p \cdot w}{4} \quad (11)$$

which gives the area of a generally round plane figure (e. g., circle) of perimeter p and typical width w. The result was known in almost all ancient cultures. The passage from (11) to (10) becomes clear by considering double segment (Fig. 4) for which $p = 2s$, $w = 2h$, and $A_0 = 2A$. In fact, on substituting these in (11) we get

$$A = (s \cdot h)/2 \quad (12)$$

which leads to (10) by using (3).

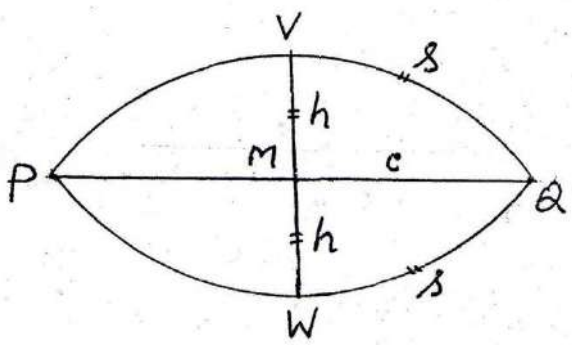

Fig. 4

The formula (10) is explicitly found and used in the Egyptian demotic papyri called *P. Cairo* (3rd cent BCE). One problem deals with an equilateral triangle (of side 12 divine units) enclosed by a circle (Fig. 5). The height h of the segment *PVQ* is correctly taken as 1/3 of the height ($= \sqrt{108}$) of the triangle. Its area is found by (10).

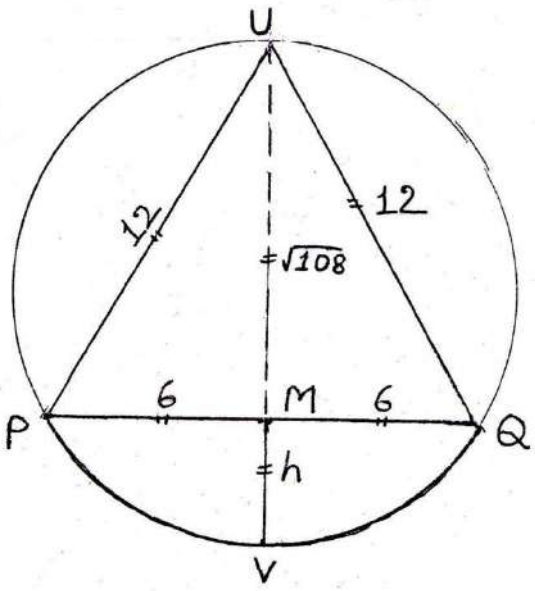

Fig. 5

The rule (10) is found in the Chinese *Jiu Zhang Suan Shu* (1st cent. CE) and was known to Zhang Qiujian (about 840 CE). It was used by Shen Gua to derive

$$s = c + 2h^2/d \quad (13)$$

which is found in his *Menggi Bitan* ("Dream Pool Essays") (1086 CE). Heron (Greek; 1st cent. CE) attributed (10) to "the ancients" and mentioned its modified forms. An improved form is

$$A_1 = (c+h)\cdot\frac{h}{2} + (\pi - 3)c^2/8 \quad (14)$$

The form with π = 22/7 is found in the work of the Roman Columella (62 CE), in the Hebrew *Mishnat ha-Middot* (about 150 CE) and in Chenese *Siyuan Yujian* (1303 CE) of Zhu Shiji who took π = 157/50 also in (14).

Rule (10) is said to be based on π = 3 for which it gives an exact result in the case of a semicircle. As a rough rule, this is also found in Mahāvīra's *Gaṇitasāra Saṅgraha* VII.43, in Nemicandra's *Trilokasāra*, 762 (about 980 CE), and others. It was also modified in India as

$$A_2 = (c+h)\cdot h\cdot \pi/6 \quad (15)$$

The form with $\pi = \sqrt{10}$ is found in the *Triśatikā*, 47 of Śrīdhara (about 750 CE) and in other works up to late times. Forms with π = 19/6, 22/7, and 63/20 are also found in India.

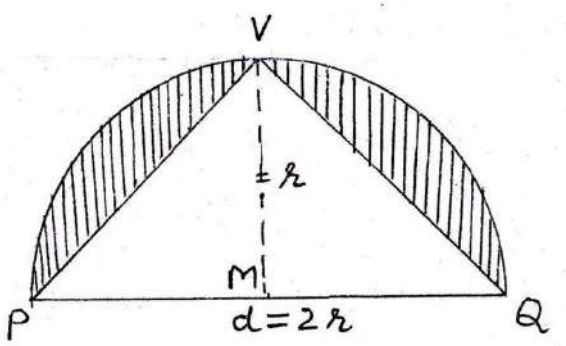

Fig. 6

Analogy as a method of proof has been quite common through the ages. For deriving (10), several analogies exist. Similarity of segment with semicircle is quite natural. With the approximation π = 3, the area $A_3 (= 3r^2/2)$ of the semicircle (Fig. 6) can be expressed as

$$A_3 = \left(\frac{1}{2}\right)(2r\cdot r) + 2\left(\frac{r^2}{4}\right) = (\text{area of } \Delta PVQ) + 2\cdot(VM)^2/4 \quad (16)$$

where $(VM)^2/4$ represents the shaded area of each sub-segment.

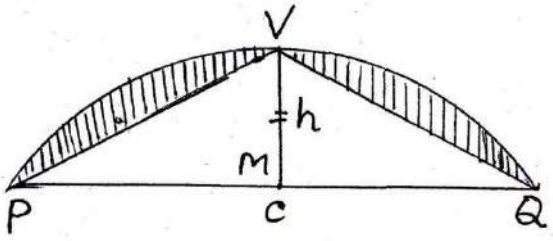

Fig. 7

Hence, by analogy, the area A_4 of the segment (Fig. 7) can also be taken as

$$A_4 = (\text{area of } \Delta PVQ) + 2\cdot(VM)^2/4 \quad (17)$$

$$= (1/2)ch + 2\left(\frac{h^2}{4}\right) \quad (18)$$

which is the desired result (10). In this context, the Chinese Liu Hui (263 CE) noted

an interesting analogy in a regular polygon of 12 sides. Let P, P_1, P_2, V, P_3, P_4, Q be the vertices of upper half of the polygon (Fig. 8). The area of this half figure can be easily seen to be exactly $(3/2)r^2$ and Liu Hui found that the area of the shaded subtrapezoid on each adjacent side of ΔPVQ will also be exactly $r^2/4$ (in a semicircle these expressions represent only approximate values).

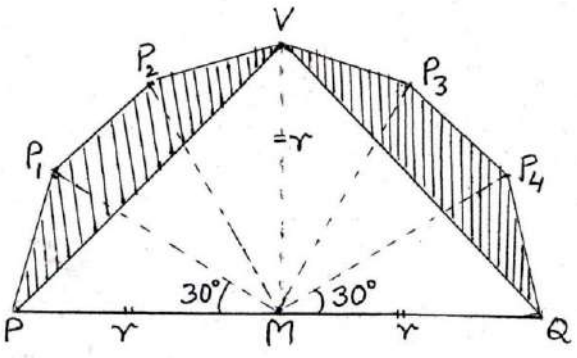

Fig. 8

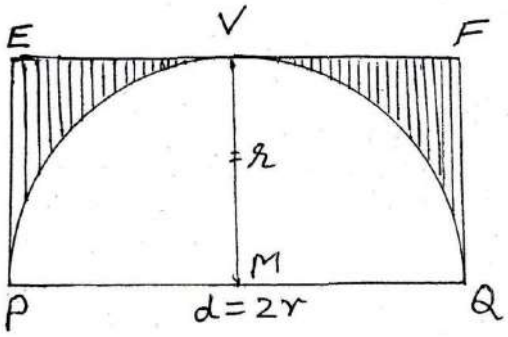

Fig. 9

Instead of inscribed triangle, the circumscribed rectangle (enclosing the figures) may be considered. Here we have, for the semicircle (Fig. 9)

$$A_5 = 2r \cdot r - 2 \cdot (r^2/4)$$
$$= (\text{area } PEFQ) - 2(VM)^2/4 \quad (19)$$

where $(VM)^2/4$ now represents the (extra) area of each curvilinear corner triangle. So by analogy, the area of the segment (Fig. 10) will be

$$A_6 = Ch - h^2/2 \quad (20)$$

which is indeed found in the Babylonian text *BM85194* according to one interpretation. The Babylonians might have used a simpler concept.

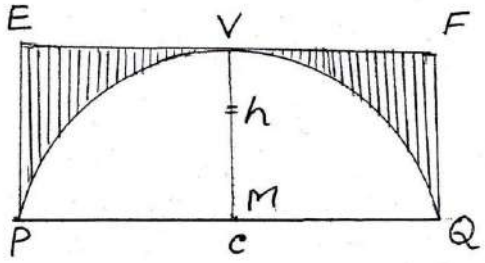

Fig. 10

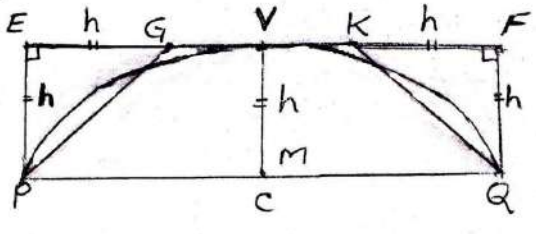

Fig. 11

Area of each curvilinear triangle can be taken equal to that of an isosceles right triangle at each corner. Together, the two such right triangles (*PEG* and *QFK*) (Fig. 11) form a square of area h^2. So the area of the segment will be

$$A_7 = Ch - h^2 \quad (21)$$

One thing to note is that the correction term in (18) or (20) is numerically same (namely $h^2/2$). So by taking the average of A_4 and A_6, we get the empirical rule

$$A_8 = (3/4)Ch \quad (22)$$

for the area of the segment. Interestingly, this rule follows also by directly taking the mean of the areas of the inscribed triangle and the circumscribed rectangle. Adjusted to use the general value of π, it becomes

$$A_9 = (\pi/4) \cdot Ch \quad (23)$$

The form of (23) with $\pi = \sqrt{10}$ was regarded as accurate in the Jaina School in India and is found in various works. These include, for example, the *Tiloya Pannatti*, IV.

2401 of Yativssabha (before 607 CE) and *Brhatksetra Samāsa* I. 122 of Jinabhadra Gani (607 CE).

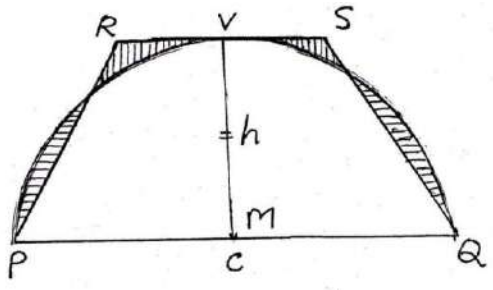

Fig. 12

Lastly, a geometrical unity of most of the above rules may be highlighted. A circular segment *PVQP* can be nicely approximated (in area) to a suitable trapezoid *PRSQ* (Fig. 12). The following are easily seen:

(i) When *RS* =*h*, we get the popular formula (10);

(ii) When *RS* = *c* – *h*, we get the rule (20);

(iii) When *RS* = *c* – 2*h*, we get (21);

(iv) When *RS* = *c*/2, we get (22);

(v) And when *RS* = *r*, we get a new rule, namely

$$A_{10} = (c + r) \cdot \frac{h}{2}, \text{ when } r < c \quad (24)$$

The present author found this rule by using the ancient Babylonian rule (3) in the usual relation

Segment *PVQP* =

(Sector *OPVQO*) – (Triangle *OPQ*)

where *O* is the centre (not shown) of the arc *PVQ* (Fig. 1). Thus apparently different rules stand connected and unified mathematically. We do seek patterns in mathematics as well as in its history.

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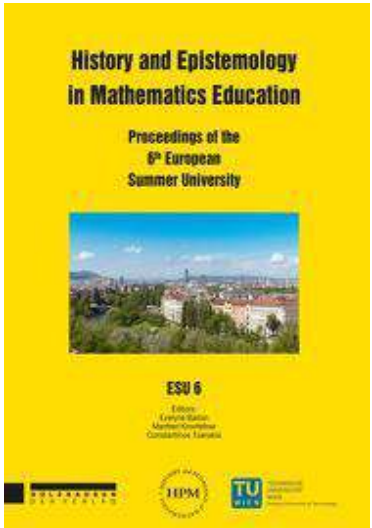
Book reports

New book: History and Epistemology in Mathematics Education

The proceedings from the 6th European Summer University on the History and Epistemology of Mathematics (which was held in Vienna in 2010) is now available from Amazon.de, Holzhausen or via an order form.



PREFACE

This volume contains texts and/or abstracts of all contributions to the scientific programme of the 6th *European Summer University* (ESU 6) on the *History and Epistemology in Mathematics Education*, which took place in Vienna, from 19 to 23 July 2010. This was the sixth meeting of this kind since July 1993, when, on the initiative of the French IREMs[1] the first *European Summer University on the History and Epistemology in Mathematics Education* took place in Montpellier, France. The next ESU took place in Braga, Portugal in 1996, conjointly with the *HPM*[2] Satellite Meeting of ICME 8), the 3rd in Louvain-la-Neuve and Leuven, Belgium in 1999, the 4th in Uppsala, Sweden in 2004, conjointly with the *HPM* Satellite meeting of ICME 10 and the 5th in Prague, Czech Republic in 2007.

Since its original conception and realization, ESU has been developed and established into one of the major activities of the HPM Group. Its purpose is not only to stress the multifarious role that history and epistemology can play in the teaching and learning of mathematics, in the sense of a technical tool for instruction, but also to reveal that mathematics should be conceived as a living science, a science with a long history, a vivid present and an as yet unforeseen future.

This conception of mathematics and its teaching and learning is reflected into the main themes along which the scientific program of each ESU is structured. This time, they were as follows:

1. Theoretical and/or conceptual frameworks for integrating history in mathematics

[1] *Institut de Recherche sur l'Enseignement des Mathématiques*.

[2] The International Study Group *on the Relations between the History and Pedagogy of Mathematics*, affiliated to ICMI.

education

2. History and epistemology implemented in mathematics education: classroom experiments & teaching materials, considered from either the cognitive or/and affective points of view; surveys of curricula and textbooks
3. Original sources in the classroom, and their educational effects
4. History and epistemology as tools for an interdisciplinary approach in the teaching and learning of mathematics and the sciences
5. Cultures and mathematics
6. Topics in the history of mathematics education

Publishing the Proceedings of the ESUs has always been a major task, since in all cases they have become standard references in this domain[3]. In addition, it has been decided that the Proceedings is published after ESU 6, so that authors are given the opportunity to enrich their text as a result of the feedback they would gain during this European Summer University. As a consequence, this volume is divided into six parts that correspond to the six main themes mentioned above. It includes full texts and/or abstracts of the 91 contributions to the scientific program of ESU 6. In particular, full texts have been submitted for 61 out of the 91 contributions to the ESU 6 program and 52 of them were finally accepted, including 6 plenary lectures and 2 panel discussions. Each submitted full text for a workshop, or an oral presentation has been reviewed by one or two members of the Scientific Program Committee at the usual international standards. In most cases authors were asked to amend their papers. Papers that have been finally accepted are included here. In all other cases in which either the text was not accepted, or no full text has been submitted, only an abstract of the corresponding contribution appears. In addition, abstracts for poster contributions and short communications are also included.

For each main theme, one plenary lecture was delivered and its text appears in the corresponding section. The same holds for the two panel discussions, which were also delivered in plenary sessions. There are also papers coming from workshops, which are a type of activity of special interest, making focus on studying a specific subject and having a follow-up discussion. The role of the workshop organizer was to prepare, present and distribute the historical/epistemological (3-hour workshops) or pedagogical/didactical material (2-hour workshops), which motivated and oriented the exchange of ideas and the discussion among the participants. Participants read and worked on the basis of this material (e.g. original historical texts, didactical material, students' worksheets etc). The reader of these Proceedings will find here historical resources, like abstracts of original texts, and pedagogical resources for all levels of mathematics education, from elementary school to the university. Finally, there are texts and abstracts based on 30-minute oral presentations, short communications and poster contributions.

There were 152 contributors and participants from 28 different countries worldwide. They were secondary school teachers, university teachers and graduate students, historians of mathematics, and mathematicians, all interested in the relations between mathematics, its history and epistemology, its teaching, and its role at present and in the past. We thank all of them. Special thanks go to the 29 members of the International Scientific Program Committee,

[3]The proceedings are available online from the HPM websites http://www.clab.edc.uoc.gr/hpm/ and http://grouphpm.wordpress.com

(see p. 699), who willingly reviewed the submitted papers, thus contributing essentially to the scientific quality of this volume, and all members of the Local Organizing Committee (see p. 700), who succeeded to make ESU 6 an insightful and interesting scientific event that took place in a warm and friendly atmosphere. We also thank the personnel of the Vienna University of Technology for their help and kindness. Finally, we thank all institutions which, in one way or another supported the organization of ESU 6: The Institute of Discrete Mathematics and Geometry of the Vienna University of Technology, Vienna, Austria, for hosting ESU 6, the Austrian Federal Ministry of Science and Research (BMWF), the Government of the City of Vienna (Wien Kultur), the Vienna Convention Bureau, Casio Europe and Texas Instruments for financial support of the meeting and the publication of its proceedings.

Evelyne Barbin,
University of Nantes (France)
Manfred Kronfellner,
Vienna University of Technology (Austria)
Constantinos Tzanakis,
University of Crete (Greece)

1. Theoretical and/or conceptual frameworks for integrating history in mathematics education

Plenary Lecture	
M.N. Fried	*History of Mathematics in Mathematics Education: Problems and Prospects*
Panel Discussion	
E. Barbin (coordinator), F. Furinghetti, S. Lawrence, B. Smestad	*The role of the history and epistemology of mathematics in pre-service teachers training*
Workshops based on historical and epistemological material	
A. Bernard	*On Diophantus' Arithmetica, the exact nature of his project and its interest for mathematics teaching today* (abstract)
L. Puig	*Proofs in presymbolic algebra: A preliminary account with implications for education* (abstract)
Workshops based on didactical and pedagogical material	
T.H. Kjeldsen	*Does History have a significant role to play for the learning of mathematics? Multiple perspective approach to history, and the learning of meta level rules of mathematical discourse*
J. van Maanen	*The teacher as a researcher in the history of mathematics* (abstract)
C. Vicentini	*How can we improve our reasoning?* (abstract)
Oral Presentations	
G. Buendía	*The use of periodicity through history: elements for a social epistemology of mathematical knowledge*
A. Cesar de Mattos, Adriana, O.J. Abdounur	*A brief study of George Boole's paper: "Exposition of a general theory of linear transformations" (abstract)*
G.E. Grimberg	*L'histoire de la représentation géométrique des nombres complexes et l'enseignement de la géométrie*
S. Nordheimer	*Mathematical connections at school: Understanding and facilitating connections in mathematics*
L. Rogers	*Concept Maps as Visualisation: their role as an epistemological device for introducing and implementing History of Mathematics in the classroom*[4]
H-S. Siller	*Modelling in classroom – 'Classical Models' (in Mathematics Education) and recent developments*
C. Tzanakis, Y. Thomaidis	*Classifying the arguments and methods to integrate history in mathematics education: an example*

[4]Oral presentation, accompanied by a 3-hour workshop based on historical and epistemological material (ch.2.4).

2. History and epistemology implemented in mathematics education: classroom experiments & teaching materials, considered from either the cognitive or/and affective points of view; surveys of curricula and textbooks

Plenary Lecture	
U.Th. Jankvist	*An implementation of two historical teaching modules: Outcomes and perspectives*
Panel Discussion	
A. Boyé, A. Dematté, E. Lakoma, C. Tzanakis (coordinator)	The history of mathematics in school textbooks
Workshops based on historical and epistemological material	
U.Th. Jankvist	*Students' meta-issue discussions of history of mathematics: Looking for anchoring* (abstract)
L. Rogers	*Maps, Narratives and Orientations: The use of Concept Maps for exploring our Mathematical Heritage in the Classroom* (abstract)
D. Tournès	*Ancient nomograms for modern classroom activities* (abstract)
Workshops based on didactical and pedagogical material	
B. Amit, N. Movshovitz-Hadar	*Design and high-school implementation of mathematical-news-snapshots: An action-research into today's news is tomorrow's history*
P. Catarino, C. Costa	*One teaching experience based on the nonius of Pedro Nunes and the icosian game of Hamilton (abstract)*
A. Dematté	*History and image of mathematics: an experiment*
H. Eggermont, M. Roelens	*Defining derivatives, integrals and continuity in secondary school: a phased approach inspired by history*
M. Hykšová	*Geometric probability applications through historical excursion*
B. Morey, P. C. de Faria	*The learning of mathematics by a didactical sequence mediated by the history of mathematics*
K. Nikolantonakis, B. Smestad	*Historical methods for multiplication*
H. Pinto	*The History of Mathematics in the classroom - some activities*
Oral Presentations	
A. Amaral, A.Gomes, M. E. Ralha	*A historical approach of the fundamental concept of measurement: Measuring "Time", in Portuguese Textbooks for 5th and 6th grades*
R. Bebbouchi,	*My teaching experiments in the History of Mathematics for the Licence in Mathematics (abstract)*
R. Chorlay	*Teaching history of science to future teacher-trainers: first report (abstract)*
G. Faustmann	*Classroom experiences with the history of mathematics*
B. Gómez	*Historical conflicts and subtleties with the sqrt sign in textbooks*
K. Klembalski	*Contribution of cryptography to mathematics teaching: A way to illustrate mathematics as a living science*
P-H. Liu	*Evolution of College Students' Epistemological Views of Mathematics in A History-Based Class*
A. Rosas, L. del R. Pardo	*Newton's Principia Mathematica in a twenty first century classroom*
B. Smestad	*History of mathematics in Norwegian Language: A literature survey*
C. Vicentini	*"Cauchy in Gorizia", in memory of Giorgio Bagni: A year after his passing away*
Poster (abstract)	
L. Ruzickova	*Developing the 'geometrical eye' through model based problem posing*

3. Original sources in the classroom, and their educational effects

Plenary Lecture	
M. Glaubitz	*The Use of Original Sources in the classroom: Empirical Research Findings*
Workshops based on historical and epistemological material	

O. Bruneau	*ICT and History of Mathematics: the case of the pedal curves between the 17th-century and the 19th-century*
K. Clark	Joost Bürgi's conception of the logarithm (1620) (abstract)
Workshops based on didactical and pedagogical material	
M. Glaubitz	*Teaching Methods for the Use of Original Sources in the Classroom (abstract)*
M. Isoda	*Using historical instruments and interactive e-Textbook for experiencing the interpretation of historical textbooks: What prospective teachers learned through the lesson study project on the context of lesson study (abstract)*
S. Lawrence	*Digitising the past mathematics by the future mathematicians (abstract)*
F. Metin	*Good Old arithmetic* (abstract)
J. Nuno Silva	*Pedagogical and Mathematical Games throughout the Times: from Rithmomachia to Hex (abstract)*
Oral Presentations	
O. Bruneau, Th. De Vittori	*Inquiry-based mathematics, history of mathematics and new communication tools: an exciting challenge !*
J. B. Pitombeira de Carvalho	*The construction, by Euclid, of the regular pentagon*
J.F. Kiernan	*The Use of Original Sources in an Undergraduate History of Mathematics Class*
R.M. Machado, M. Sampieri Santinho	*The False-Position in the proportional reasoning teaching* (abstract)
R.Massa-Esteve, I. Guevara Casanova, F. R. Vallhonesta, C. Puig-Pla	*Understanding mathematics using original sources: Criteria and conditions*
L. Molitorisová	*Use of the History of Negative Numbers in Education*
F. Schweiger	*The algorithms of Poincaré, Brun, and Selmer*
E. Sebastiani Ferreira	*L´Hôpital's challenge to geometers for the rectification of de Beaune's curve*
M. J. Mendes, B. Morey	*Introducing Copernicus' De Revolutionibus to trainee math teachers*

4. History and epistemology as tools for an interdisciplinary approach in the teaching and learning of mathematics and the sciences

Plenary Lecture	
R. Pisano	*Physics–Mathematics relationship: Historical and Epistemological notes*
Workshops based on historical and epistemological material	
E. Barbin	*Mathematisation of nature and new conceptions of curves in the years 1630* (abstract)
R. Chorlay, A. Michel-Pajus	*What can we learn from a 16th Occitan Treatise of Arithmetic? (abstract)*
R. Godard	*An anthology of mathematical tools for numerical methods: from 1805 to 1855*
Workshops based on didactical and pedagogical material	
E. Dimitriadou, C. Tzanakis	*Geometrical and physical models to introduce vectors in secondary education*
H. N. Jahnke	*Historical Mini-theories as away to reflect about the meaning of proof*
M. Kourkoulos, C. Tzanakis, M. Tsigris	*Enhancing students' understanding of variance: physical experiments based on a historically inspired model (abstract)*
Oral Presentations	
R. Guitart	*The Beginning of Potential Theory (abstract)*
B. Kamrlova	*From arts to mathematics and back Contextual Learning – Practical Interdisciplinarity* (abstract)
Z. Kimličková,	*Using history of algebra as a tool for motivating mathematical thinking of secondary school students* (abstract)
X. Lefort	*Courbes de raccordement dans les chemins de fer au XIXème siècle* (abstract)
A. Rosas, L. del Rocío Pardo	*Mathematics for students of Digital Arts and Graphics Design: A historical approach* (abstract)

5. Cultures and Mathematics

Plenary Lecture	
M. Moyon	*Practical Geometries in Islamic Countries: the example of the division of plane figures*[5]
Workshops based on historical and epistemological material	
Th. de Vittori	*The perfect compass: conics, movement and mathematics around The 10th century*
M. Moyon	*The mediaeval geometries: a way to use the history of mathematics in the classroom of mathematics* (abstract)
M. K. Siu	*Inscribed square in a right triangle* (abstract)
Oral Presentations	
C. Costa, M.M. Nascimento, P. Catarino, R. Fernandes	*The yoke: (ethno)materials for math classes*
A. V. Rohrer, G. Schubring	*The concept of beauty defined by the Makonde people*
M. K. Siu	*1607, a year of (some) significance: Translation of the first European text in mathematics --- Elements --- into Chinese*[6]
Posters (abstracts)	
S.S. Kim	*Using Art and Music for Secondary school Math education*
A. M. Rosas Mendoza	*Infinite Series before algebra and calculus*

6. Topics in the history of mathematics education

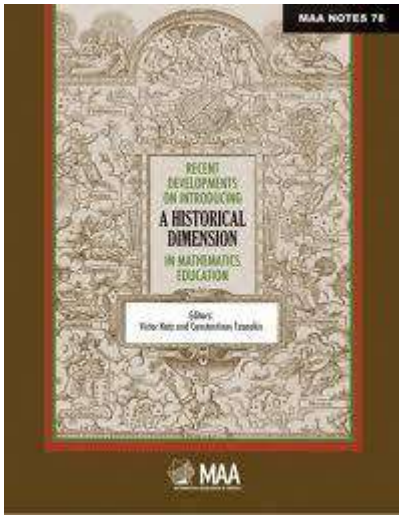
Plenary Lecture	
F. Furinghetti, L. Giacardi,	*From Rome to Rome: Events,People, and Numbers during ICMI's First Century*
Workshops based on historical and epistemological material	
K. Bjarnadóttir	*17th and 18th century European arithmetic in an 18th century Icelandic manuscript*
G. Moussard	*The place of geometrical construction problems in French 19th century mathematics textbooks*
T. Roque	*Les définitions les plus rigoureuses sont-elles plus faciles à comprendre? Charles Meray et la proposition d'une définition « naturelle » des nombres irrationnels*
Oral Presentations	
O. J. Abdounur, A. Cesar de Mattos, W. Valente	*The role of the European Universities in the formation of the Brazilian universities: the case of the university of São Paulo (abstract)*
P. Catarino, C. Costa	*A survey on the Portuguese Mathematician José Morgado Júnior: life and work* (abstract)
A. Christiansen,	*Bernt Michael Holmboe's textbooks and the development of mathematical analysis in the 19th century*
C. Costa, E. Pereira, J. Vitória	*Teaching Linear Algebra in the Portuguese Universities: The case of the University of Coimbra* (abstract)
N. Dias, E. Amaral, J. Cobos Bueno	*An analysis of the mathematical education in Portugal in the late eighteenth century*
L. Giacardi	*The training of mathematics teachers in Italy (1875-1923)* (abstract)
K. Lepka	*Alois Strnad - Leading personage of I. and R. mathematical olympiad*
J. M. Matos, M. Almeida	*Shaping a modern mathematics pedagogical content knowledge: the case of Telescola in Portugal in the middle 1960s* (abstract)
C. Mota, M. E. Ralha, M. F. Estrada	*The concept of tangent line: Historical and didactical aspects in Portugal (18th century)*
Poster (abstract)	
E. Luciano	*Mathematics Textbooks for Schools (1898-1939): The cultural proposal of the School of Giuseppe Peano*

[5]Plenary lecture, accompanied by a 3-hour workshop based on historical and epistemological material (ch.5.3).

[6]Oral presentation, accompanied by a 3-hour workshop based on historical and epistemological material (ch.5.4).

New book: Recent Developments on Introducing a Historical Dimension in Mathematics Education

Victor Katz and Constantinos Tzanakis (Eds.)



Recent Developments on Introducing a Historical Dimension in Mathematics Education consists of 24 papers (coming from 13 countries worldwide). The volume aims to constitute an all-embracing outcome of recent activities within the HPM Group (International Study Group on the Relations Between History and Pedagogy of Mathematics). We believe these articles will move the field forward and provide faculty with many new ideas for incorporating the history of mathematics into their teaching at various levels of education.

The book is organized into four parts. The first deals with theoretical ideas for integrating the history of mathematics into mathematics education. The second part contains research studies on the use of the history of mathematics in the teaching of numerous mathematics topics at several levels of education. The third part concentrates on how history can be used with prospective and current teachers of mathematics. We also include a special fourth part containing three purely historical papers based on invited talks at the HPM meeting of 2008. Two of these articles provide an overview of the development of mathematics in the Americas, while the third is a study of the astronomical origins of trigonometry.

You can see the Preface here:
http://www.maa.org/ebooks/pdf/NTE78_Preface.pdf
You can see all the abstracts here:
http://www.maa.org/ebooks/pdf/NTE78_abstracts.pdf
You can buy it here:
http://www.maa.org/ebooks/notes/NTE78.html

The list of the 24 papers:

1: *Teaching with Primary Historical Sources: Should it Go Mainstream? Can it?*, by David Pengelley
2: *Dialogism in Mathematical Writing: Historical, Philosophical and Pedagogical Issues*, by Evelyne Barbin
3: *The Process of Mathematical Agreement: Examples from Mathematics History and an Experimental Sequence of Activities*, by Gustavo Martinez-Sierra and Rocío Antonio-Antonio
4: *Researching the History of Algebraic Ideas from an Educational Point of View*, by Luis Puig
5: *Equations and Imaginary Numbers: A Contribution from Renaissance Algebra*, by Giorgio T. Bagni
6: *The Multiplicity of Viewpoints in Elementary Function Theory: Historical and Didactical Perspectives*, by Renaud Chorlay

7: *From History to Research in Mathematics Education: Socio-Epistemological Elements for Trigonometric Functions*, by Gabriela Buendia Abalos and Gisela Montiel Espinosa

8: *Harmonies in Nature: A Dialogue Between Mathematics and Physics*, by Man-Keung Siu

9: *Exposure to Mathematics in the Making: Interweaving Math News Snapshots in the Teaching of High-School Mathematics*, by Batya Amit, Nitsa Movshovitz-Hadar, and Avi Berman

10: *History, Figures and Narratives in Mathematics Teaching*, by Adriano Demattè and Fulvia Furinghetti

11: *Pedagogy, History, and Mathematics: Measure as a Theme*, by Luis Casas and Ricardo Luengo

12: *Students' Beliefs About the Evolution and Development of Mathematics*, by Uffe Thomas Jankvist

13: *Changes in Student Understanding of Function Resulting from Studying Its History*, by Beverly M. Reed

14: *Integrating the History of Mathematics into Activities Introducing Undergraduates to Concepts of Calculus*, by Theodorus Paschos and Vassiliki Farmaki

15: *History in a Competence Based Mathematics Education: A Means for the Learning of Differential Equations*, by Tinne Hoff Kjeldsen

16: *History of Statistics and Students' Difficulties in Comprehending Variance*, by Michael Kourkoulos and Constantinos Tzanakis

17: *Designing Student Projects for Teaching and Learning Discrete Mathematics and Computer Science via Primary Historical Sources*, by Janet Heine Barnett, Jerry Lodder, David Pengelley, Inna Pivkina and Desh Ranjan

18: *History of Mathematics for Primary School Teacher Education Or: Can You Do Something Even if You Can't Do Much?*, by Bjørn Smestad

19: *Reflections and Revision: Evolving Conceptions of a Using History Course*, by Kathleen Clark

20: *Mapping Our Heritage to the Curriculum: Historical and Pedagogical Strategies for the Professional Development of Teachers*, by Leo Rogers

21: *Teachers' Conceptions of History of Mathematics*, by Bjørn Smestad

22: *The Evolution of a Community of Mathematical Researchers in North America: 1636-1950*, by Karen Hunger Parshall

23: *The Transmission and Acquisition of Mathematics in Latin America, from Independence to the First Half of the Twentieth Century*, by Ubiratan D'Ambrosio

24: *In Search of Vanishing Subjects: The Astronomical Origins of Trigonometry*, by Glen Van Brummelen

Reports on new books are welcome.

Work in progress

We encourage young researchers in fields related to *HPM* to send us a brief description of their work in progress or a brief description of their dissertation.

Have you read these?

Abdeljaouad, M. (2011). The First Egyptian Modern Mathematics Textbook. *International Journal for the History of Mathematics Education*, Vol. 6 (2).

Acerbi, F. (2011). Completing Diophantus, *De polygonis numeris*, prop. 5. *Historia Mathematica*, 38(4), 548-560.

Adams, C. (2011). Leonhard Euler and the Seven Bridges of Königsberg. *The Mathematical Intelligencer* 33(4): 18-20.

Alexander, A. (2011). The Skeleton in the Closet: Should Historians of Science Care about the History of Mathematics?. *Isis*, *102*(3), 475-480.

Barrow-Green, J. (2011). An American Goes to Europe: Three Letters from Oswald Veblen to George Birkhoff in 1913/1914. *The Mathematical Intelligencer* 33(4): 37-47.

Beery, J.; Mead, C. (2011). Who's That Mathematician? Images from the Paul R. Halmos Photograph Collection. *Loci Convergence* (January 2012).

Bernard, A.; Christianidis, J. (2012). A new analytical framework for the understanding of Diophantus‟s *Arithmetica* I–III. *Archive for History of Exact Sciences*, Vol. 66 (1), 71-93.

Berndt, B. C. (2011). The Chief Accountant and Mathematical of Friend of Ramanujan - S. Narayana Aiyar. *The American Mathematical Monthly (November)*, 767-776.

Cardil, R. (2011). Kepler: The Volume of a Wine Barrel. *Loci Convergence* (June 2011).

Cooper, L. (2011). Did Egyptian scribes have an algorithmic means for determining the circumference of a circle?. *Historia Mathematica*, 38(4), 455-484.

Craik, A. D. D. (2012). The Popular lectures and addresses of William Thomson, Baron Kelvin of Largs (1824–1907). *BSHM Bulletin: Journal of the British Society for the History of Mathematics*, Vol. 27 (1), 50-55.

Cuomo, S. (2012). Exploring ancient Greek and Roman numeracy. *BSHM Bulletin: Journal of the British Society for the History of Mathematics*, Vol. 27 (1), 1-12.

Del Latto, A. J.; Petrilli Jr., S. J. (2011). Algebraic Formalism within the Works of Servois and Its Influence on the Development of Linear Operator Theory. *Loci Convergence* (January 2012).

Dick, S. (2011). AfterMath: The Work of Proof in the Age of Human–Machine Collaboration. *Isis*, *102*(3), 494-505.

Epple, M. (2011). Between Timelessness and Historiality: On the Dynamics of the Epistemic Objects of Mathematics. *Isis*, *102*(3), 481-493.

Fujita, T.; Jones, K. (2011). The Process of Redesigning the Geometry Curriculum: The Case of the Mathematical Association in England in the Early Twentieth Century. *International Journal for the History of Mathematics Education*, Vol. 6 (1).

Furinghetti, F. (2011). The History of Mathematics Education in the Studies of 18 Countries. *International Journal for the History of Mathematics Education*, Vol. 6 (2).

Gluchoff, A. (2011). Artillerymen and mathematicians: Forest Ray Moulton and changes in American exterior ballistics, 1885–1934. *Historia Mathematica*, 38(4), 506-547.

Gray, J. (2011). History of Mathematics and History of Science Reunited?. *Isis, 102*(3), 511-517.

Hart, R. (2011). The Chinese Roots of Linear Algebra. *Isis*, 102 (4), 751-752.

Hodgson, B. R.; Rogers, L. F. (2011). Aspects of Internationalism in Mathematics Education: National Organizations with an International Influence. *International Journal for the History of Mathematics Education*, Vol. 6 (2).

Howson, G. (2011). Informal Mathematics Education in England Prior to 1870. *International Journal for the History of Mathematics Education*, Vol. 6 (1).

Karp, A. (2011). Interview with Zalman Usiskin. *International Journal for the History of Mathematics Education*, Vol. 6 (1).

Karp, A. (2011). Interview with Ubiratan D‟Ambrosio. *International Journal for the History of Mathematics Education*, Vol. 6 (2).

Kent, D. (2012). Alice Bache Gould: mathematician in search of war work, 1918. *BSHM Bulletin: Journal of the British Society for the History of Mathematics*, Vol. 27 (1), 38-49.

Magnello, M. E. (2012). Victorian statistical graphics and the iconography of Florence Nightingale's polar area graph. *BSHM Bulletin: Journal of the British Society for the History of Mathematics*, Vol. 27 (1), 13-37.

Mann, T. (2011). History of Mathematics and History of Science. *Isis, 102*(3), 518-526.

Netz, R. (2011). Ludic Proof: Greek Mathematics and the Alexandrian Aesthetic. *Isis*, 102 (4), 753-754.

Nossum, R. (2012). Emigration of mathematicians from outside German-speaking academia 1933–1963, supported by the Society for the Protection of Science and Learning. *Historia Mathematica*, 39(1), 84-104.

Puig, L. (2011). Historias de al-Khwārizmī (6ª entrega). El cálculo con la cosa. *Suma, 67*, 101-110.

Puig, L. (2011). Historias de al-Khwārizmī (7ª entrega). Figuras y demostraciones. *Suma, 68*, 93-102.

Raynaud, D. (2012). Abū al-Wafā‟ Latinus? A study of method. *Historia Mathematica*, 39(1), 34-83.

Rédei, M.; Werndl, C. (2012). On the history of the isomorphism problem of dynamical systems with special regard to von Neumann‟s contribution. *Archive for History of Exact Sciences*, Vol. 66 (1), 1-69.

Richards, J. L. (2011). “This Compendious Language”: Mathematics in the World of Augustus De Morgan. *Isis, 102*(3), 506-510.

Rogers, L. F. (2011). Mathematics Education in Scotland: A Brief History. *International Journal for the History of Mathematics Education*, Vol. 6 (2).

Santucci, L. C. (2011). Recreating History with Archimedes and Pi. *Mathematics Teacher*, 105(4).

Sidoli, N.; Saito, K. (2012). Comparative analysis in Greek geometry. *Historia Mathematica*, 39(1), 1-33.

Spalt, D. D. (2011). Welche Funktionsbegriffe gab Leonhard Euler?. *Historia Mathematica*, 38(4), 485-505.

Valente, W. R. (2011). The Ubiratan D"Ambrosio Personal Archive: A Source for the History of Mathematics Education. *International Journal for the History of Mathematics Education*, Vol. 6 (1).

Van Sickle, J. (2011). The History of One Definition: Teaching Trigonometry in the US before 1900. *International Journal for the History of Mathematics Education*, Vol. 6 (2).

Announcements of events

ICME 12

July 8–15, 2012
Seoul, South Korea

http://www.icme12.org/

Participants will find useful information about every aspect of the Congress in this site. The web page is being constantly updated in order to keep participants and interested people informed.

Congress Period and Venue
The Congress is to be held on July 8th to 15th in 2012. All of the Congress activities will take place at the COEX (Convention & Exhibition Center) in Seoul, Korea. COEX, World Trade Center, 159 Samsung-dong,Gangnam-gu, Seoul 135-731, Korea

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Important Deadlines
Submission of Proposals
Topic Study Group (TSG)
November 30, 2011
Workshops & Sharing Group (WSG)
November 30, 2011
Posters
December 15, 2011

Notification of Acceptance
WSG Acceptance
December 31, 2011
TSG and Posters
January 15, 2012

ICME-12 Grants

Application

February 15, 2012

Notification to Grantees

March 1, 2012

Submission of Final Paper and Description of Programme Items

April 10, 2012

Registration Fee

Category	Before April 1	Before June 1	From June 2
General	USD 400	USD 450	USD 500
HPM or MCG Participant	USD 320	USD 360	USD 400
Accompanying Person		USD 130	

What is ICME?

The International Congress on Mathematical Education (ICME) is held every four years under the auspices of the International Commission on Mathematical Instruction (ICMI). It is, however, planned and organized by separate committees, which operate independently of the ICMI: The International Program Committee (IPC), The Local Organizing Committee (LOC), and National Advisory Committee (NAC).

The aim of the Congress is to present the current state of and trends in mathematics education research and in the practice of mathematics teaching at all levels. The Congress will gather a broad spectrum of participants such as researchers in mathematics education, teacher trainers, practicing teachers, mathematicians and others interested in mathematics education.

The objectives of the ICME are:

- to show what is happening in mathematics education worldwide, in terms of research as well as teaching practices,
- to inform about the problems of mathematics education around the world,
- to learn and benefit from recent advances in mathematics education as a discipline,
- to exchange information on the problems of mathematics education around the world,
- to introduce exemplary cases of domestic classrooms (teaching) in mathematics education, which contributes to improvement of mathematics education around the world or vice versa,
- to improve the quality and professionalism of domestic mathematics teachers through introduction of exemplary cases in mathematics education worldwide.

The themes

(...)

TSG 20: The role of history of mathematics in mathematics education

(...)

TSG 35: The history of the teaching and learning of mathematics

(...)

For the others TSG's, please, see the previous HPM Newsletter.

TSG 20: The role of history of mathematics in mathematics education

The aim of TSG 20 is to provide a forum for participants to analyse issues related to the introduction of a historical dimension in mathematics education. The introduction of such a dimension involves three different areas: mathematics, history and didactics. This TSG aims to find and elaborate on a harmonious, balanced and effective interrelationship among these three scientific areas in a way that is enlightening and fruitful in mathematics education. It is expected that participants will share their ideas and classroom experience in connection with the following main issues:

- Theoretical and/or conceptual frameworks for including history in mathematics education
- The role of the history of mathematics in pre- and in-service teacher education

- The role of the history of mathematics at school
- Original sources in the classroom, and their educational effects
- Design and/or assessment of teaching/learning materials on using history in mathematics education

TSG 35: The history of the teaching and learning of mathematics

History of mathematics teaching and learning is relatively new as a subject of international attention and research, but it is developing actively and dynamically. It became the first time visible at ICME 10, in 2004, at Copenhagen, as the TSG 29. The success and dynamics of these activities lead to the launching of the first international journal devoted to this field of study, the International Journal for the History of Mathematics Education, published since 2006. History of mathematics education became then a subject in various international meetings, for instance at the ESU 5 in Prague, in 2007, and at the CERME meetings. As TSG 38 at ICME 11, in Monterrey, research into this subject proved its productivity again, with papers presented on the history of the reform movements, on the analysis of classical textbooks and of historical practice. Recently, the first specialized international research symposium took place, in Iceland, featuring in particular methodological issues.

On the occasion of ICME 10, a first international bibliography of research in the field was prepared. The bibliography is now retrievable at the following address:

http://www.icme-organisers.dk/tsg29/BiblTSG.pdf.

This bibliography outlined streams in research: transmission and socio-cultural reform movements; aspects of teaching practice (textbooks, methods, teacher professionalizations); cultural, social and political functions of mathematics instruction; and comparative studies.

Discussion Groups

DG 1: Current problems and challenges in Non-university Tertiary Mathematics Education (NTME)
DG 2: Creativity in Mathematics Education
DG 3: Issues Surrounding Teaching Linear Algebra
DG 4: The Evolvement of Mathematics Teachers' Community-of-Practice
DG 5: Uses of History of Mathematics in School (pupils aged 6 - 13)
DG 6: Postmodern Mathematics
DG 7: Improving Teacher Professional Development Through Lesson Study
DG 8: Theory and Perspective of Mathematics Learning and Teaching from the Asian Regions
DG 9: Using Technology to Integrate Geometry and Algebra in the Study of Functions
DG 10: New Challenges in Developing Dynamic Software for Teaching and Learning Mathematics
DG 11: Mathematics Teacher Retention
DG 12: Mathematics Teacher Educators' Knowledge for Teaching
DG 13: The Role of Mathematics Education in Helping to Produce a Data Literate Society
DG 14: Mathematical Modeling in Connecting Concepts to Real World Application
DG 15: Mathematics and Culture in Micronesia: An exploration of the mathematical aspects of indigenous practices
DG 16: Can art save mathematics?
DG 17: Teaching of Problem Solving in School Mathematics Classrooms

DG 5: Uses of History of Mathematics in School (pupils aged 6 - 13)

Aim and Rationale

For more than twenty years, the number of people studying relationships between history of mathematics and pedagogy of mathematics has been steadily increasing. One landmark work was the 2000 ICMI Study, History in Mathematics Education, which gave a comprehensive overview of the field at the time. (Fauvel & van Maanen, 2000)

The publication of the 2000 ICMI study raised

awareness that history of mathematics in teaching mathematics:
- allows pupils to experience the process of mathematics - problem solving, proof construction (e.g., Lakatos, 1976; Ernest, 1998);
- provides the landscape of Guided reinvention (Freudenthal, 1991);
- expands understanding of nature of mathematics; that is, mathematics is not "finished" and continues to evolve and some ideas are subject to change (Ernest, 1998); and
- often relies on not taking the end results of mathematicians' works as starting points (Freudenthal, 1973) aimed at progressive mathematization (Gravemeijer & Doorman, 1999, p. 116).

The International Study Group on the Relations Between the History and Pedagogy of Mathematics (HPM Group) has been active since 1976. In addition to numerous publications and participation in several conferences (e.g., European Summer University; CERME), the HPM Group hosts an ICME satellite meeting every four years. Although a number of papers resulting from these conferences concerns the inclusion of history in primary and secondary school (pupils aged 6 – 16), the result is still that there are not many resources available for teachers who teach mathematics to students aged 6 – 13. An analysis of 130 papers from the HPM satellite conferences in 2000 and 2008, published in HPM Newsletter No. 77, shows that there are far more papers for pupils aged 14 – 19 than for 6 – 13. (Smestad 2011)

The inclusion of history of mathematics in primary and secondary school often does not go further than storytelling and the purpose of the use of historical content is more to increase student motivation instead of deepening student learning. (Smestad 2003, 2004) However, in the general literature there are several other examples, including:
- working with original sources (that can include historical pictures or historical texts from textbooks or other sources);
- using old techniques or algorithms;
- using concrete materials in ways they were used in history, such as clay tablets or counting boards;
- performing plays on the history of mathematics;
- exercises based on the history of mathematics, either implicitly or explicitly;
- incorporating cross-curricular approaches;
- completing projects on mathematicians; and
- producing exhibitions.

There is a need for discussions on which methods of working with history of mathematics are suitable for younger children and which are aligned with their particular topics of study. Furthermore, there is need for discussion on which of the goals outlined above are of particular interest when working with younger children.

Key Questions

1. Which ideas from HPM can be used with children (aged 6-13) in such a way that produces a god result(e.g. improved student engagement, positively impacted student learning)?
2. What would be criteria for finding, developing and selecting materials to be used with children (aged 6-13)?
3. How does the HPM community in particular (and mathematics education community more broadly) assure that high quality material that cover a variety of topic are produced and shared?

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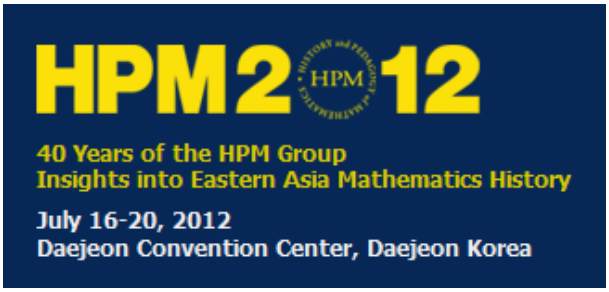

Second announcement HPM 2012

July 16–20, 2012
Daejeon, South Korea

Aim and focus

The HPM 2012 is the eighth quadrennial meeting of the International Study Group on the Relations between the History and Pedagogy of Mathematics (the HPM Group), affiliated to ICMI. It is a satellite meeting of the corresponding ICME (International Congress on Mathematical Education) and is scheduled close to ICME. These quadrennial meetings are a major activity of HPM, to bring those together who are interested in the relation between the history of mathematics and mathematics education such as:

- Researchers in mathematics education, and its relation to the history of mathematics;
- Mathematics teachers at all levels who are eager to get insights on how the history of mathematics may be integrated into teaching and help students to learn mathematics;
- Historians of mathematics, who wish to talk about their research;
- Mathematicians, who want to learn about new possibilities to teach their discipline;
- All those with an interest in the history of mathematics and pedagogy.

Main themes

The HPM 2012 is a place where mathematicians, educators, historians, researchers and students can make presentations and participate in discussions.

The programme and activities are structured around the following main seven themes:

1. Theoretical and/or conceptual frameworks for integrating history in mathematics education;
2. History and epistemology implemented in mathematics education: classroom experiments & teaching materials;
3. Original sources in the classroom, and their educational effects;
4. Mathematics and its relation to science, technology and the arts: historical issues and educational implications;
5. Cultures and mathematics;
6. Topics in the history of mathematics education;
7. Mathematics from Eastern Asia.

Invited speakers

- Tinne Hoff Kjeldsen (Denmark): "Uses of history for the learning of and about mathematics: towards a theoretical framework for integrating history of mathematics in mathematics education."
- Tsang-Yi Lin (Taiwan): "Using History of Mathematics in High School Classroom: Some Experiments in Taiwan."
- Janet Barnett (USA): "Bottled at the Source: The Design and Implementation of Classroom Projects for Learning Mathematics via Primary Historical Sources."
- Dominique Tournès (France): "Mathematics of the 19th century engineers: methods and instruments."
- Ubiratan d'Ambrosio (Brazil): "Mind and Hand: the complexity and diversity of mathematics in different cultural environments."
- Johan Prytz (Sweden): "Social structures in mathematics education. Researching the history of mathematics education with theories and methods from sociology of education."
- Sung Sa Hong (Korea): "Theory of Equations in the history of Chosun Mathematics."

Panels

Panel 1:
"Why do we require a "history of mathematics" course for mathematics teacher candidates?":
Kathy Clark (USA) coordinator, Funda Gonulates (Turkey), Maria Rosa Massa (Spain), Frédéric Métin (France).

Panel 2:
"Empirical research on history in mathematics education: future challenges for our field":
Uffe Thomas Jankvist (Denmark) coordinator, Yi-Wen Su (Taiwan), Isoda Masami (Japan), David Pengelley (USA).

Time and place

HPM 2012 will be held from **Monday 16 July** to **Friday 20 July 2012** in **Daejeon, Korea**.

Sessions will be held on Monday, Tuesday, Thursday and Friday with a cultural tour on Wednesday.

ICME-12 will be held from **Sunday 8 July** to **Sunday 15 July 2012** in **Seoul, Korea**. Its scientific program includes oral presentations and activities on the history and pedagogy on mathematics and on the history of mathematical teaching. It is planned that these activities will take place in the end of this meeting and that a special price for inscriptions will be granted to those who will participate to both ICME-12 and HPM 2012.

Submission of proposals

ABSTRACTS

Oral presentations and Workshops

30 November 2011:
deadline for submitting Abstracts
31 December 2011:
notification of acceptance

Posters and Exhibitions

31 December 2011:
deadline for submitting Abstracts
31 January 2012:
notification of acceptance

The members of the Scientific Program Committee (SPC) will review the submitted abstracts. At this stage, acceptance of a proposal means that the proposed activity will be included in the HPM 2012 Scientific Programme. It is planned to have the proceedings ready at the meeting. For more details, see Proceedings.

The web site

Making known the HPM 2012 in various countries is a major task to be realized by the SPC. To this end, a web site is available at http://www.hpm2012.org. This is going to be a very efficient tool to make known the HPM 2012 worldwide, allowing online registration etc.

Proceedings

Publishing the Proceedings of HPM 2012 is also a major task, and will be available in the meeting.

Each submitted full text for an oral presentation or a workshop will be reviewed by members of the SPC at the usual international standards.

More details on the size of the texts, the format guidelines will be announced in due course from the HPM 2012 and HPM websites, respectively;

http://www.hpm2012.org
http://www.clab.edc.uoc.gr/hpm/.

Oral presentations and Workshops

31 January 2012: **deadline** for submitting Full Texts

20 March 2012: notification of acceptance or not of the submitted texts.

Posters and Exhibitions

15 February 2012: **deadline** for submitting Full Texts

31 March 2012: notification of acceptance or not of the submitted texts.

Registration fee

Early registration (before 1 April 2012):
180$ (students 90$)
Regular registration (before 1 June 2012):
230$ (students 130$)
Registration from 1 June 2012, or on the spot:
270$ (students 160$)

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5th International Conference of the European Society of History of Science

November 1-3, 2012
Athens, Greece

The *5th International Conference of the European Society of History of Science* is organized in Athens, 1-3 November 2012, by the Institute of Neohellenic Research of the National Hellenic Research Foundation (Dr. E. Nicolaidis) and the Faculty of Education of the National and Kapodistrian University of Athens (Prof. C. Skordoulis). The theme of the conference is "Scientific cosmopolitanism and local cultures: religions, ideologies, societies".

- Deadline for grant application: February 10, 2012 (Notification of acceptance by 9 April)
- Deadline for abstract submission: February 24, 2012 (Notification of acceptance by 2 April)
- Deadline for early registration: May 4, 2012
- Opening: November 1st, 2012

The list of accepted symposia:
(http://5eshs.hpdst.gr/symposia)

1. Ancient Astronomy and its Later Reception
2. Around Henri Poincaré's Centenary: physics, mathematics and philosophy.
3. Byzantine and post-Byzantine alchemy: principles, influences and effects
4. Cartesian Physics and its reception: between local and universal
5. Cultural Identity and Trans-Nationality in the History of Science
6. Engineers, Circulation of Knowledge, and the Construction of Imperial and Post-Imperial Spaces (18th- 20th century)
7. Exact sciences in Habsburg Monarchy in 18th century (on 300th anniversary of Boscovich's birthday)
8. From cameralism and natural philosophy to applied biology: agriculture and science in the 19th-20th centuries
9. Gender and the cosmopolitan character of science
10. Global phenomena and local specificities: conduits between scientifically minded elites and holders of artisanal knowledge between the East and the West.
11. Historical Narratives of Cold War Science
12. History and Historical Epistemology Of Science. Conceptual Streams and Mathematical Physical Objects in the Emergency Of Newton's Science
13. History and Philosophy of Science in EU Secondary Curricula? New Proposals Wanted
14. History of Slavic Science – Cultural Interferences, Historical Perspectives and Personal Contributions
15. Humanities, mathematics and technics at Renaissance courts
16. Mathematical Courses in engineering education in the seventeenth and eighteenth century in the Iberian Peninsula
17. Mechanism, embodiment and life: iatromechanism and chemistry in debate in early modern natural philosophy
18. Physical sciences between Europe and the USA before WWII
19. Prefaces as correspondences in the context of Ancient Greek, Arabic and Latin mathematics texts
20. Science and Scandal: Scientific Controversy in the Public Space
21. Scientific archives, unpublished manuscripts in private or public corpuses: historiographical and methodological approaches.
22. Scientific Cosmopolitanism
23. Scientific Expeditions: Local Practices and Cosmopolitan Discourses
24. The Exact Sciences in the Eastern Mediterranean in the Modern and Contemporary Ages
25. The next science of humankind. Myths and histories of the Neurosciences
26. The Origins of Experimental Philosophy: Experimental Procedures and Empirical Methods in Early Modern Europe
27. The reception of the `synthetic evolutionary theory' in Europe: from Great Britain to Germany and Russia
28. The scientific cosmopolitanism as traced by astronomical instruments
29. The scientific culture of medieval Jews: facts and questions
30. The Tools of Research and the Craft of History: On the Interaction between Historians, Their Tools, and the Creators of Those Tools
31. Transnational Economic Science after WWII
32. Women in the Laboratory from the early modern times to the 20th century

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http://www.clab.edc.uoc.gr/hpm/

These and other news of the HPM group are also available on the website

http://grouphpm.wordpress.com/

(the online and on time version of this newsletter).

Items for the Newsletter should be sent to the editors, preferably by email (see addresses below).

The Newsletter appears three times a year with the following deadlines for next year.

No.	Deadline for material	Sent to distributors
80	**12 June 2012**	**1 July 2012**
81	12 October 2012	1 November 2012
82	12 February 2013	1 March 2013

The Newsletter is the communication of the International Study Group on the Relations between the History and Pedagogy of Mathematics, an affiliate of the International Commission on Mathematical Instruction.

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A note from the Editors

The Newsletter of HPM is primarily a tool for passing on information about forthcoming events, recent activities and publications, and current work and research in the broad field of history and pedagogy of mathematics. The Newsletter also publishes brief articles which they think may be of interest. Contributions from readers are welcome on the understanding that they may be shortened and edited to suit the compass of this publication.