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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This and earlier issues of the Newsletter can be downloaded from our website
http://www.clab.edc.uoc.gr/hpm/

Interview with Evelyne Barbin

France is unique in having institutes of research into mathematics education which are supported with government funding so that teachers at schools and universities can work together on aspects of mathematics and pedagogy. Evelyne Barbin tells how this came about, how history of mathematics became a prime interest and how French colleagues became involved with HPM.

Evelyne Barbin and Ubiratan D'Ambrosio

CW How did IREM study groups first arise?

EB The IREM study groups (Institutes of Research into Mathematics Education) were created at the end of the 1960s and beginning of the 1970s following the Modern Mathematics reform in France. The IREM were university institutes linked to university mathematics departments. They had four goals: pedagogical research, in-service education for teachers of mathematics, contributing to initial teacher training and the production of published material. Members of IREM are university lecturers and secondary school teachers from collèges and lycées who continue to teach in their respective institutions. The joint aim of research and training characterises IREM. These institutes have an original structure and are unique in France. There are no such institutes for other subjects despite calls for them in other disciplines, such as philosophy, physics and geography. The work of the different IREMs are drawn together through national 'Inter-IREM Commissions'. These are composed of representatives from the regional IREMs which meet regularly in Paris.

The formal and dogmatic style of the Modern Mathematics reform as it was adopted in France soon became a cause for concern, especially in IREM groups. The research into the history of mathematics by IREM groups contributed to a counter-reform movement. The fact was that the proponents of the Modern Mathematics reform wanted to teach a unified concept of mathematics where mathematics was to be considered as 'a language'. Against that, the researches into history of mathematics which were then taking place in the IREM groups were more concerned with the process of mathematical activity and with the construction of mathematical concepts and knowledge. Such historical research, as we said at the time, constituted an 'anti-dogmatic therapy'.

CW You mentioned that the study groups of the regional institutes were linked together through Inter-IREM Commissions. How did this assist the study of the history of mathematics?

EB The Inter-IREM Commission 'Epistemology and History of Mathematics' was founded in May 1975 at the initiative of Jean-Louis Ovaert and Christian Houzel. I was present at the inaugural meeting where there were just half a dozen of us. From the start, this commission sought both to provide a framework for those groups already active (Caen, Dijon, Poitiers, Rouen) and to provide a base for the creation of new groups. The groups were set to work on different topics and to prepare in-service courses in the history of mathematics in their local university-school academies. My contribution was to start a study group on the history of algebraic equations in Rouen in October 1975. From the beginning, the Epistemology and History inter-IREM Commission met in Paris two or three times per year with an average of about fifty participants.

From the beginning two significant strands of working emerged in the inter-IREM Commission and in the regional IREM groups. The first was to consult the original works of mathematicians as opposed to working with accounts of the history of mathematics. Working on these texts created a great deal of interest and produced a 'cultural shock' which itself led to 'epistemological astonishment'. A major work of reprinting books and old texts was undertaken [including translations from Latin into French], this being possible because IREMs were able to publish. Different groups started to visit university and municipal libraries in a search for original texts. A joint enterprise of unearthing original texts was undertaken and the inter-IREM Commission acted as co-ordinator of this collaborative work. The second strand of our work concerned interdisciplinary studies. In the second half of the 1970s the IREM groups attracted teachers of other disciplines who contributed to the link between mathematics and, for example, physics or French. Also, from the start, teachers of physics, history and above all philosophy, contributed to the 'Epistemology and History of Mathematics' groups. In France, philosophy is taught to all students in the last class of the lycée. In some schools teachers of mathematics and philosophy shared the teaching of their classes.

CW Apart from publications, how did members of different IREM study groups get to know about what was going on in other IREMs?

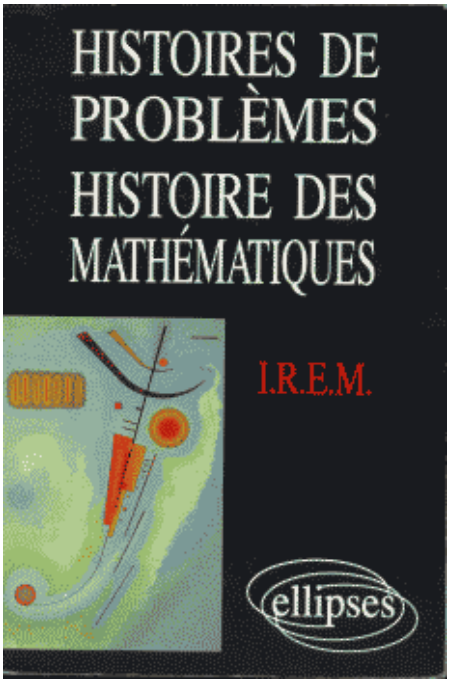
EB Conferences became an important part of the life of IREM study groups. The first inter-IREM conference was organised by the Caen IREM in June 1977, the theme of the conference being 'the introduction of an historical perspective into the teaching of mathematics'. The chosen topic is evidence of the fact that from the outset the research of IREM was concerned with the relations between history and the teaching of mathematics. Our concern was with finding out why the history of mathematics ought to be used in teaching mathematics and how this could be done. Many of the IREM groups were represented at the Caen conference and it was significant that the conference also attracted teachers of philosophy. The next conference was organised in Marseille in May 1979 with the title: 'What history of mathematics can bring to teaching and teacher training'. I became chair of the inter-IREM Commission at this time and was responsible for organising the third conference, in June 1981 at Rouen, on 'History and the teaching of mathematics'. Thus the work of IREM was developed around historical research, epistemology and pedagogy. Further conferences were organised every two years, each by a different IREM group. The topics for these conferences were quite varied. Thus in 1989 the Besançon conference was on 'Mathematics proof in history' and in 2002 the Orleans conference was on 'The history of probability and statistics'. The themes were always chosen from what would be of interest to teachers of mathematics. Each conference attracted about a hundred participants of which about half were from lycées, and about a quarter each from collèges and universities.

CW The sort of work done by the IREM History and Epistemology study groups is similar to the interests of HPM. When did IREM begin to develop collaborative activities with HPM?

EB The inter-IREM Commission joined the HPM meeting at the ICME-4 conference at Berkeley in 1980 and has continued to attend HPM meetings. At the Berkeley conference we presented a collection of the first historical publications produced by the IREM groups. This collection of articles was published later under the title 'La rigueur et le calcul' which was the first publication of the inter-IREM Commission apart from proceedings of conferences. In 1988 for the HPM meeting in Florence, and also for the ICME-6 conference in Budapest, IREM published a work 'Towards an historical perspective in the teaching of mathematics'. This work caused something of a stir because it presented fifteen examples of using history in the teaching of mathematics at different levels – collège, lycée and university – which had been undertaken by members of IREM in their own classes. These were not in any way 'special classes' and so the work was an invitation to all mathematics teachers to become interested in history and to use history in their classes. This work showed history being used in many quite different ways and I wrote in the preface that we had no wish to propose a model or a single way of using history when teaching mathematics. The recommendation was not to teach the history of mathematics, nor even to introduce mathematical anecdotes into the lesson, but to integrate history into the mathematics being taught. This work was later edited by John Fauvel in 1990 as *History in the Mathematics Classroom: the IREM Papers*.

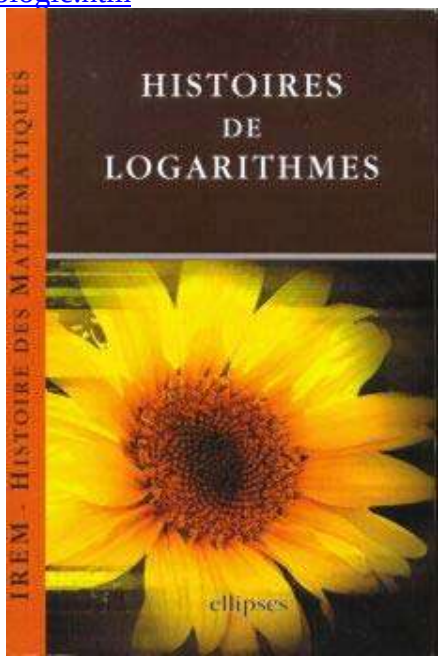
CW It is often said that it is difficult to use history in teaching mathematics if the mathematics teacher has no background knowledge of the history of the subject and its significance. Did you find that this was a problem when you tried to encourage more use of history in mathematics?

EB Yes, of course that's true. Many of the examples given in the Budapest work consisted of students reading historical texts in class. This type of work presupposes a good knowledge of the history of mathematics on the part of the teachers who would be able to place the texts in their appropriate historical, epistemological and scientific contexts. We have always insisted that a good knowledge of history and even experience of research are necessary preconditions for teachers wishing to bring history into their mathematics lessons. This explains why many IREM members have gone on to undertake doctoral research, some of them becoming historians in their own right. It was in order to support and encourage the training of teachers that IREM began to organise a series of summer universities (*universités d'été*) and to publish their proceedings as an aid for teachers of mathematics.



CW Could you say something about the inter-IREM publications?

EB Two distinct categories of work have been published by the inter-IREM Commission. The first are grouped around themes. For example, *Histoires de problèmes, Histoire des mathématiques* (1993), published in English as *History of Mathematics, Histories of Problems* (1997), insists on the role of problems in the historical construction of concepts and knowledge. The work *Les philosophes et les mathématiques* (1996) followed from a series of lectures organised by the inter-IREM Commission given by philosophers reflecting on the contribution of philosophers to mathematical concepts. The works of sixteen philosophers were analysed, from Plato to Jean Cavaillés, some of whom were themselves mathematicians, such as Descartes and Bolzano. The most recent work of this type, *Histoire de logarithmes*, appeared in 2006. The second type of publication consists of anthologies of texts, placed in their historical context, and in some cases accompanied by suggestions about their use in class. Four such anthologies have so far appeared, the most recent being a collection of texts by Newton and Leibniz. Many other publications by different IREM groups have also appeared and interested readers can consult the website: http://www.univ-irem.fr/commissions/epistemologie/accueil/epistemologie.htm



CW You have already said how important the *universités d'été* were for encouraging and supporting research into using history for teaching mathematics. The French model later inspired summer universities on history and epistemology of mathematics that spread beyond the borders of France.

EB Yes, the Ministry of Education proposed the idea of a *université d'été* at the beginning of the 1980s. Ministry support meant financial help both for the organisation of the university and for the teachers attending. I organised the first one in Le Mans in 1984 and this proved to be a very important event because it brought us into contact with many new colleagues. Directly as a result of that meeting new IREM groups were started, for example in Strasbourg and Reims. Ever since that first *université d'été* we have organised a meeting every two years, being either a two day conference or a week long summer university. We were very fortunate because the Ministry accepted all our proposals and this was an epoch of great enthusiasm. The first European Summer University was organised by the inter-IREM Commission in Montpellier in 1993. We planned the conference along the same lines as those we had previously organised in Le Mans (1984), Toulouse (1986), Poitiers (1998) and in Lille (1992). The Montpellier summer university was a huge success with 250 participants coming from 20 countries. Since then we have supported the move to have these summer universities in other countries, the most recent being in Prague in 2007.

Chris Weeks, UK

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Conference reports

ESU5 – 5th European Summer University On The History And Epistemology In Mathematics Education (Esu-5) 19–24 July 2007

Charles University in Prague, Faculty of Education, Prague, Czech Republic
http://www.pedf.cuni.cz/kmdm/esu5

The *5th European Summer University on the History and Epistemology in Mathematics Education* (ESU 5) was successfully organized in Prague from 19 to 24 July 2007 thanks to the efforts of our Czech colleagues and the collaboration of all members of its International Scientific Programme Committee. It was an insightful and interesting scientific event that took place in a warm and friendly atmosphere, in which participated 192 participants from 33 different countries worldwide.

This meeting (and the ESU in general) aimed (i) to provide a forum for presenting research in mathematics education and innovative teaching methods based on a historical, epistemological and cultural approach to mathematics and their teaching; (ii) to give the opportunity to mathematics teachers, educators and researchers to share their teaching ideas and classroom experience; (iii) and in this way, to motivate further collaboration in this perspective among members of the mathematics education community in Europe and beyond.

The programme of ESU 5 has been structured along the following main themes:
1. History and Epistemology as tools for an interdisciplinary approach in the teaching and learning of Mathematics and the Sciences
2. Introducing a historical dimension in the teaching and learning of Mathematics
3. History and Epistemology in Mathematics teachers' education
4. Cultures and Mathematics
5. History of Mathematics Education in Europe
6. Mathematics in Central Europe

It included 6 *plenary lectures* (one on each main theme) and two *panels*, namely:

– *Theme 1*: Leo Corry, University of Tel Aviv (Israel): *Axiomatics between Hilbert and R.L. Moore: Two Views on Mathematical Research and their Consequences on Education*.
– *Theme 2*: Luis Puig, University of Valencia (Spain): *Researching the history of algebraic ideas from an educational point of view*.
  Panel: *Mathematics of yesterday and teaching of to day*: Evelyne Barbin (France) coordinator, Abraham Arcavi (Israel), Luis Radford (Canada), Fritz Schweiger (Austria).
– *Theme 3*: Fritz Schweiger, University of Salzburg (Austria): *The implicit grammar of mathematical symbolism*.
– *Theme 4*: Ulrich Rebstock, University of Freiburg (Germany): *Mathematics in the service of the Islamic community*.
– *Theme 5*: Hélène Gispert, University of Orsay (France) & Gert Scubring, University of Bielefeld, (Germany): *The history of Mathematics Education and its contexts in 20th century France and Germany*.
  Panel: *The emergence of mathematics as a major teaching subject in secondary schools:* Gert Schubring (Germany) coordinator, Hélène Gispert (France), Livia Giacardi (Italy), Nikos Kastanis (Greece).

– *Theme 6*: Magdalena Hyksova, Czech Technical University in Prague (Czech Republic): *Contribution of Czech mathematics to the theory of probability*

A major part of the ESU 5 programme consisted of *workshops*: There were 19 2-hours workshops based on didactical and pedagogical material and 25 3-hours workshops based on historical and epistemological material. Additionally, there were parallel sessions with 44 30-minute *oral presentations* and another 26 10-minute *short announcements*. The detailed scientific program and abstracts for all activities is still

available from the ESU 5 web site
http://www.pedf.cuni.cz/kmdm/esu5

The Proceedings are under preparation. It has been decided that they will be published after ESU-5, so that authors are given the opportunity to enrich their text as a result of the feedback they gained during this ESU. More specifically, full texts for workshops and oral presentations have been submitted by the end of September 2007 and are now under review by the members of the International Scientific Programme Committee. In addition, the Proceedings will include full texts for all plenary lectures and panel discussions, as well as, abstracts of all short announcements. It is expected that the proceedings will be available during HPM 2008, the next HPM Group Satellite Meeting of ICME 11 in Mexico City (visit its website at http://www.red-cimates.org.mx/HPM2008.htm) and will be sent to all registered participants by ordinary mail.

For more information on ESU-5 and the previous ESU see the ESU-5 and HPM websites http://www.pedf.cuni.cz/kmdm/esu5 http://www.clab.edc.uoc.gr/hpm/
the HPM Newsletter issue no58 p.27-30,
or contact
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C. Tzanakis, Greece

The editors welcome reports from conferences.

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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.

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Ph.D. thesis

Scientific cognition and cultural evolution: theoretical tools for integrating social and cognitive studies of science

Christophe Heintz
Ph.D Thesis, EHESS, Paris, 2007.

This work is a study in the historiography of science. Its goal is to provide some theoretical tools for studying the evolution of science as a social and cognitive phenomenon. It aims at showing that some concepts and frames of analysis drawn from cognitive anthropology are fruitful tools for the scientific study of science. The theories that I advocate using are the epidemiology of representation and the theory of distributed cognition. The added value of these theories stems in great part from their enabling to integrate results from cognitive and social studies of science.


Christophe HEINTZ

COGNITION SCIENTIFIQUE
ET ÉVOLUTION CULTURELLE

Outils théoriques pour incorporer les études cognitives aux études sociales de la science

Doctorat nouveau régime
Discipline : PHILOSOPHIE ET SCIENCES SOCIALES

Directeur de thèse :
M. Dan SPERBER, Directeur de recherche, CNRS

Jury de thèse :
M. Daniel ANDLER, Professeur, Université de Paris-Sorbonne
M. Bernard CONEIN, Professeur, Nice-Sophia Antipolis
M. Jérôme DOKIC, Directeur d'études, EHESS
M. David GOODING, Professeur, University of Bath

ECOLE DES HAUTES ÉTUDES EN SCIENCES SOCIALES
Mai 2007

The author indicates in pp. 9-10:

[It] "is organised in four parts. *The first part* exposes the motives in favour of an integrated causal model of scientific evolution and reviews the available means. In the next chapter, I critically review some integrated models of scientific evolution. Then, in chapter three, I argue that the Strong

Programme is the best starting point for integrated, causal, studies of science.

Parts two and three expose respectively the epidemiology of representations and the theory of distributed cognition and show how they apply to the analysis of science. Each part includes three theoretical chapters and one chapter illustrating the approach with a case study in the *history of mathematics*.

The first chapter of part two introduces the problem of rationality as it occurs in science studies and proposes some solutions by distinguishing epistemological beliefs and knowledge practices on the one hand, and human cognitive abilities on the other. It proposes to study how the latter enables and constrains the formers. Chapter five expands on the innate endowment of the human mind and its consequence on the evolution of science. It shows how to accommodate nativism and some type of social constructivism in science studies. With these theories in hand, I present, in chapter six, the epidemiology of scientific representations, leading me to question the specificity of some mechanisms of the production and distribution of scientific knowledge. I apply the theoretical framework to a historical case study: the epidemiology of the 'infinitesimals' representations—especially as the occurred at the beginning of 18th century France. Through the epidemiological approach, I can draw hypotheses on the cognitive bases of the calculus and its causal role on the development of mathematics without being 'psychologistic.'

The third part is devoted to the theory of distributed cognition as applied to scientific practices. I first expose the theory and review works in science studies which applied it. The question I especially deal with is the evolution of distributed cognitive systems: chapters eight and nine attempt to find the principles through which distributed cognitive systems in science are organised, maintained through time, and changed. I eventually argue that the distribution of beliefs about what is trustworthy, and for which task, is critical in the evolution of distributed cognitive systems. Chapter eleven illustrates this claim with the analysis of the advent of computer assisted proof, with the four-colour theorem.

The fourth part is made of a conclusive chapter: I contrast the mechanisms of scientific knowledge production and distribution that I have specified in the thesis with attempts of evolutionary epistemology to reduce such mechanisms to blind variation and selective retention. I also point out some consequences of socio-cognitive studies of science for cognitive psychology."

Some characteristic fragments from the contents of the thesis are the following:

"…the practice and the history of mathematics can be better understood when the discipline of mathematics is described as a distributed cognitive system." (pp. 342-3)

"Each specialist has his own cognitive task — solving as many problems as possible in his branch—that often depends on the output of others specialists' cognitive processing — their theorems and theories.

The organisation of mathematical knowledge production, however, does not end with theoretical specialisation. It also involves the institutions that provide teaching in Mathematics, the apparatus with which mathematicians communicate and the complicate processes of evaluation of results and people. Cognitive functions are the one of students and teachers, conference organisers, editors and referees." (p. 349)

"…the history of the philosophy of mathematics is part of the history of mathematics, since beliefs about mathematics determine what mathematics is." (pp. 367-8)

This thesis (in English) is in the website:
http://christophe.heintz.free.fr/thesis/Heintz-thesis-print.pdf

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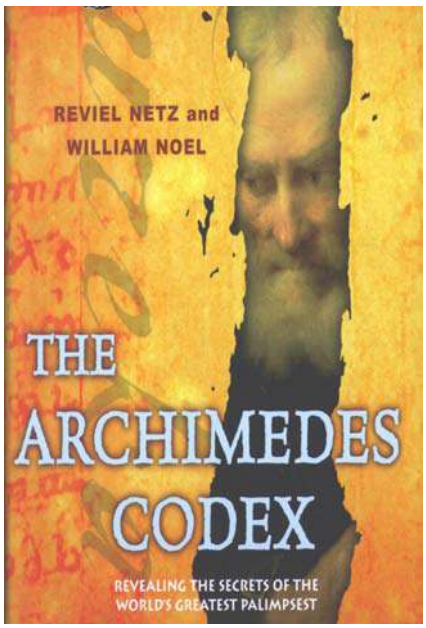
New Books

The Archimedes Codex: Revealing the Secrets of the World's Greatest Palimpsest

Reviel Netz and William Noel
Orion Publishing Co, 2007.



Synopsis:
Drawings and writings by Archimedes, previously thought to have been destroyed, have been uncovered beneath the pages of a 13th-century monk's prayer book. These hidden texts, slowly being retrieved and deciphered by scientists, show that Archimedes' thinking (2,200 years ago) was even ahead of Isaac Newton in the 17th century. Archimedes discovered the value of Pi, he developed the theory of specific gravity and made steps towards the development of calculus. Everything we know about him comes from three manuscripts, two of which have disappeared. The third, currently in the Walters Art Museum, is a palimpsest - the text has been scraped off, the book taken apart and its parchment re-used, in this case as a prayer book. William Noel, the project director, and Reviel Netz, a historian of ancient mathematics, tell the enthralling story of the survival of that prayer book from 1229 to the present, and examine the process of recovering the invaluable text underneath as well as investigating into why that text is so important. Combining intrigue, lost books, academic detection and final revelations which rewrite the history of science and mathematics, The Archimedes Codex will be a major publishing event.

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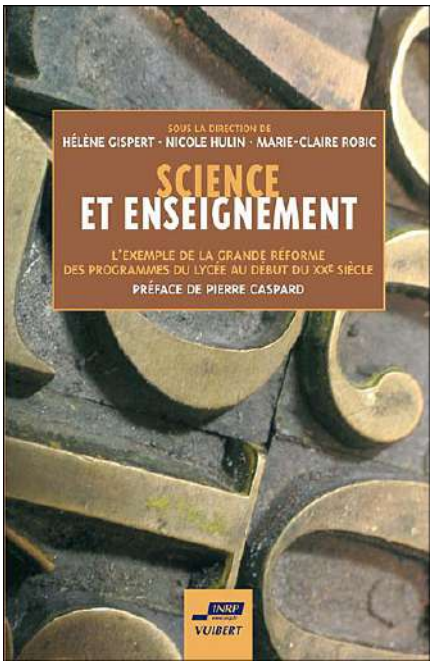
Science et enseignement: l'exemple de la grande réforme des programmes du lycée au tout début du XXe siècle

Hélène Gispert, Nicole Hulin et Marie-Claire Robic
Paris: Vuibert, INRP, 2007.



Mot de l'éditeur
Comment enseigner les sciences ? Les auteurs réunis ici apportent à ce débat des éléments historiques inédits d'une incroyable actualité. L'enseignement secondaire tel que nous le connaissons est en effet largement tributaire de la réforme de 1902 mais, si les modalités de refondation du lycée au début du XXe siècle sont bien connues des historiens des sciences et de l'éducation, un ensemble de conférences données en 1904-1905, dans le but «d'accompagner» ladite réforme, méritait d'être étudié : des savants renommés - parmi lesquels Henri Poincaré, Vidal de La Blache ou Paul Langevin - furent invités à s'exprimer devant les enseignants. Les textes furent ensuite imprimés et diffusés dans tous les lycées.

Ces conférences provoquèrent une réflexion d'ensemble sur la science,

l'épistémologie et la pédagogie. Elles témoignent de l'humanisme profond des responsables pédagogiques du début du XXe siècle : on verra que, lorsqu'ils réclamaient une plus grande convergence des disciplines scientifiques, ils se préoccupaient d'abord de transmettre aux élèves leur «enthousiasme» pour les sciences.

Cette fine analyse de l'esprit de la réforme de 1902 est aussi un précieux compte rendu des considérations pédagogiques du début du siècle dernier. Leur actualité, en plus de nous étonner, vient nous rappeler l'intérêt et l'importance d'un débat de grande ampleur sur l'enseignement.

Hélène Gispert, Nicole Hulin et Marie-Claire Robic ont réuni douze autres chercheurs spécialistes de l'histoire des sciences et de l'éducation pour étudier la question de l'enseignement des sciences à l'école : Christine Blondel, CNRS, Centre Koyré ; Jean-Pierre Chevalier, professeur à l'IUFM de Versailles ; Anne-Marie Drouin-Hans, maître de conférence, université de Bourgogne ; Jean-Marc Drouin, professeur au Muséum national d'histoire naturelle ; Renaud d'Enfert, maître de conférence à l'IUFM de Versailles ; Danielle Fauque, professeur de physique-chimie au lycée Stanislas, Paris ; Martine Jey, maître de conférence à l'IUFM de Paris ; Samuel Johsua, professeur à l'université de Provence ; Denis Lamy, CNRS et MNHN ; Philippe Nabonnand, maître de conférence à l'université de Nancy-II ; Annie Petit, professeur à l'université Paul Valéry/Montpellier-II ; Stéphane Tirard, maître de conférence à l'université de Nantes.

Extrait du livre

La question des disciplines scientifiques dans l'enquête Ribot (1899)

À l'extrême fin du XIXe siècle, l'enseignement secondaire français est structuré en deux filières - classique et moderne -d'inégale longueur et d'inégal prestige, et qui sont sanctionnées par un baccalauréat d'inégale valeur. La filière classique, la plus prestigieuse, privilégie l'étude des langues anciennes. La filière moderne (sans langues anciennes) est l'héritière de l'enseignement secondaire spécial créé en 1865 par Victor Duruy et qui proposait des études courtes, sans latin et à dominante scientifique. Transformée en enseignement moderne en 1891, elle a perdu son caractère pratique pour se rapprocher du secondaire classique. La réforme de 1902, qui scinde les études secondaires en deux cycles successifs et institue un baccalauréat unique (avec plusieurs options), achève le processus en plaçant la filière moderne au même rang que la filière classique. Cette modification en profondeur de l'architecture des études secondaires se double d'une révision à la hausse de la place accordée à l'enseignement des sciences mathématiques, physiques et naturelles.

Si les conférences, données au Musée pédagogique en 1904 et 1905, constituent une mesure d'accompagnement importante dans la mise en oeuvre de la réforme de 1902, la grande enquête parlementaire sur l'enseignement secondaire menée en 1899 en constitue le prologue. Paradoxalement, alors que la réforme proprement dite a suscité de nombreux travaux historiques, en particulier en ce qui concerne l'enseignement des sciences, cette enquête n'a guère été analysée pour elle-même, et l'étude déjà ancienne mais essentielle de la sociologue Viviane Isambert-Jamati comme celle, toute récente, de Jean-François Condette font exception à cet égard. En particulier, les historiens des disciplines scolaires, et parmi eux ceux des disciplines scientifiques, n'ont pas encore fait de l'enquête de 1899 un objet d'étude en soi.

* * *

Have you read these?

Abdulaziz, Abdulrahman A.: On the Egyptian method of decomposing 2/n into unit fractions, *Historia Mathematica*, 35(1), 2008, pp. 1-18.

Bevilacqua, Marco Giorgio: The Conception of Ramparts in the Sixteenth Century: Architecture,“Mathematics”, and

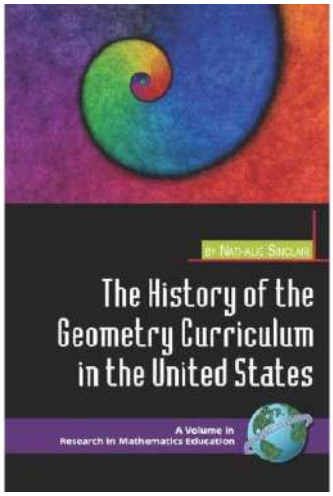
Urban Design, *Nexus Network Journal*, 9, 2007, pp. 249-262.

Bjarnadóttir, K.: The Numbers One and Zero in Northern European Textbooks, *International Journal for the History of Mathematics Education*, 2(2), 2007, pp. 3-20.

Chemla, K., Shuchun, G. (eds.): *Les neuf chapitres: le classique mathématique de la Chine ancienne et ses commentaires. Édition critique bilingue, nouvelle présentation. Trad., présentée et annotée.* - Paris : Dunod , 2005.

Corry, Leo: Axiomatics Between Hilbert and New Math: Diverging Views on Mathematical Research and Their Consequences on Education, *International Journal for the History of Mathematics Education*, 2(2), 2007, pp. 21-37.

Despeaux, Sloan Evans: Mathematics Sent Across the Channel and the Atlantic: British Mathematical Contributions to European and American Scientific Journals, 1835-1900, *Annals of Science*, 65 (1), 2008, pp. 73-99.



Dougherty, B.J. and Sinclair, N. (eds.): *The History of the Geometry Curriculum in the United States,* Information Age Publishing, 2007.

François, K., and Van Bendegem, J.P.(eds.): *Philosophical Dimensions in Mathematics Education*, Springer, 2007

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Karen François, The untouchable and frightening status of mathematics, pp. 13–39.

Susanne Prediger, Philosophical reflections in mathematics classrooms, pp. 43–58.

Dimitris Chassapis, Integrating the philosophy of mathematics in teacher training courses, pp. 61–79.

Albrecht Heeffer, Learning concepts through the history of mathematics, pp. 83–103.

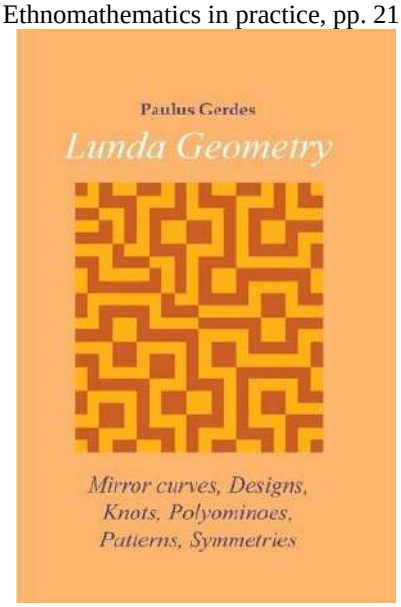
Carmen Batanero and Carmen D´ıaz, The meaning and understanding of mathematics, pp. 107–127.

Maria Meletiou-Mavrotheris, The formalist mathematical tradition as an obstacle to stochastical reasoning, pp. 131–155.

Ard Van Moer, Logic and intuition in mathematics and mathematical education, pp. 159–179.

Bart Van Kerkhove, A place for education in the contemporary philosophy of mathematics, pp. 183–209.

Rik Pinxten and Karen François, Ethnomathematics in practice, pp. 213–227.



Gerdes, P.: *Lunda Geometry: Mirror Curves, Designs, Knots, Polyominoes, Patterns, Symmetries* (196 pp.; internationally available in print and as download from lulu.com by going to 'paulus gerdes', or at http://stores.lulu.com/pgerdes (preview available)).

The book “Lunda Geometry” explains how the mathematical concepts of mirror curves and Lunda-designs were discovered in the context of the author’s research of ‘sona’, illustrations traditionally made in the sand by Cokwe storytellers from eastern Angola (a region called Lunda) and neighboring regions of Congo and Zambia. Examples of mirror curves from several cultures (Africa and ancient Egypt, South India, Celtic knots, …) are presented. Lunda-designs are aesthetically attractive and display interesting symmetry properties. Examples of Lunda-patterns and Lunda-polyominoes are presented. Some generalizations of the concept of Lunda-design are discussed, like hexagonal Lunda-designs, Lunda-k-designs, Lunda-fractals, and circular Lunda-designs. Lunda-designs of Celtic knot designs are constructed.

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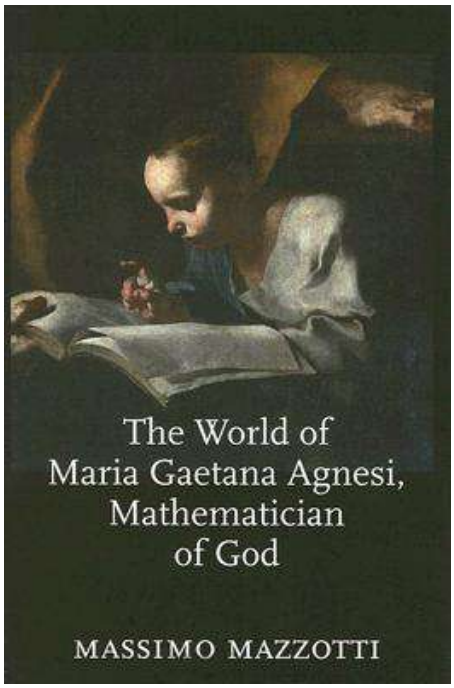

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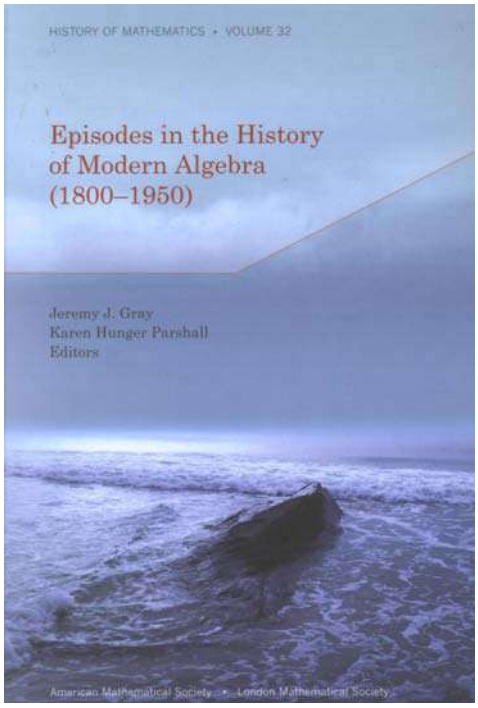

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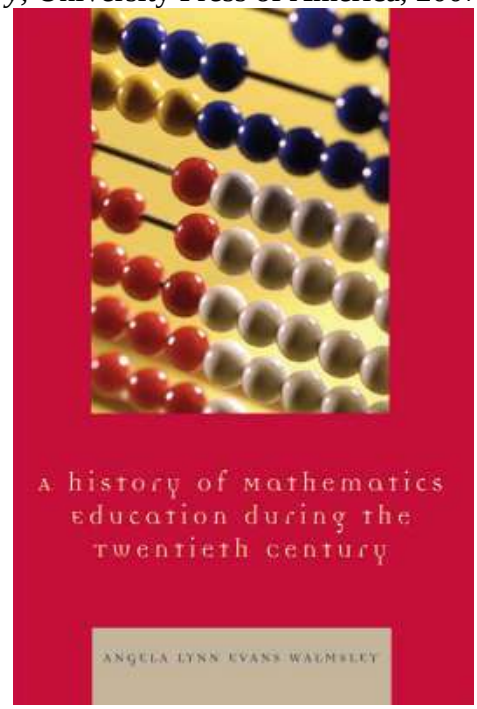

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History of Mathematics
http://www.otterbein.edu/resources/library/libpages/subject/mathhis.htm

The Garden of Archimedes. A museum for Mathematics
http://web.math.unifi.it/archimede/archimede_NEW_inglese/

Centre for the History of the Mathematical Sciences.
The Open University, UK
http://puremaths.open.ac.uk/pmd_research/CHMS/index.html

Homepage of Eleanor Robson
http://www.hps.cam.ac.uk/dept/robson.html

Societies and organisations

African Mathematical Union: Commission on the History of Mathematics in Africa (including newsletter)
http://www.math.buffalo.edu/mad/AMU/amuchma_online.html

Association des Professeurs de Mathematiques de l'Enseignement Public [APMEP] History site:
http://www.apmep.asso.fr/BMhist.html

British Society for the History of Mathematics [BSHM]
http://www.bshm.org

HOMSIGMAA - History of Mathematics Special Interest Group of the MAA
http://www.maa.org/sigmaa/hom

HPM Americas
http://www.hpm-americas.org/

Italian Society of History of Mathematics
http://www.dm.unito.it/sism/indexeng.html

Association pour la Recherche en Didactique des Mathématiques:
http://www.ardm.asso.fr/

Commission Française pour l'Enseignement des Mathématiques:
http://www.cfem.asso.fr/

Instituts de Recherche sur l'Enseignement des Mathématiques (IREM):
http://www.univ-irem.fr/

Canadian Society for History and Philosophy of Mathematics
http://www.cshpm.org

Brazilian Society for History of Mathematics
http://www.sbhmat.com.br

***Nuncius* Newsletter**
http://brunelleschi.imss.fi.it/nuncius/inln.asp?c=5302

International History, Philosophy and Science Teaching Group
www.ihpst.org

Topics and Resources

MATHS for EUROPE: The history of some aspects of mathematics like: history of mathematical persons, symbols, algorithms...
http://mathsforeurope.digibel.be/index.html
http://mathsforeurope.digibel.be/list.htm
http://mathsforeurope.digibel.be/olvp.htm
http://mathsforeurope.digibel.be/olvp2.htm
http://mathsforeurope.digibel.be/olvp3.htm

Ethnomathematics on the Web
http://www.rpi.edu/%7Eeglash/isgem.dir/links.htm

About Medieval Arabic Numbers
http://www.geocities.com/rmlyra/Numbers.html
http://www.geocities.com/rmlyra/arabic.html

Annotated Bibliography on Proof in Mathematics Education
http://fcis.oise.utoronto.ca/~ghanna/educationabstracts.html

BibM@th
http://www.bibmath.net/dico/index.php3?action=rub&quoi=0

Centro Virtual de Divulgación de las Matemáticas, esta siendo desarrollada por la Comisión de Divulgación de la *Real Sociedad Matemática Española (R.S.M.E.)*
http://www.divulgamat.net/index.asp

History of Statistics
http://www.stat.ucla.edu/history/

Images of Lobachevsky's context
http://www.ksu.ru/eng/museum/page0.htm

Images of Mathematicians on Postage Stamps
http://members.tripod.com/jeff560/index.html

Photos of Mathematicians
http://www.math.uni-hamburg.de/home/grothkopf/fotos/math-ges/

Numdam-Digitization of ancient mathematics documents
http://www.numdam.org/en/ressnum.php

The Montana Mathematics Enthusiast (journal)
http://www.montanamath.org/TMME/

Convergence: an online magazine of the MAA providing resources to teach mathematics through its history
http://convergence.mathdl.org/

International Journal for Mathematics Teaching and Learning,
http://www.cimt.plymouth.ac.uk/journal/default.htm

Homepage of International Journal for the History of Mathematics Education
http://www.tc.edu/centers/ijhmt/index.asp?Id=Journal+Home

Documents for the History of the teaching of mathematics in Italy
http://www.dm.unito.it/mathesis/documents.html

Ethnomathematics Digital Library
http://www.ethnomath.org/

Some Japanese Mathematical Landscapes*:*
The results of wandering in a beautiful country, with a mathematical eye, aided by a digital camera, by A. Arcavi
http://math.criced.tsukuba.ac.jp/museum/arcavi/arcavi_english/index.html

Wann-Sheng Horng's webpage
with HPM related materials in Chinese.
http://math.ntnu.edu.tw/~horng/

Fred Rickey's History of Mathematics Page
http://www.dean.usma.edu/math/people/rickey/hm/default.htm

Culture*MATH*. Ressources pour les enseignants de Mathématiques
www.dma.ens.fr/culturemath/actu/livres.htm

The French INRP (National Institute for Pedagogical Research) is developing a website on questions related to mathematics teaching: EducMath
http://educmath.inrp.fr

Homepage of Albrecht Heeffer
http://logica.ugent.be/albrecht/

Homepage of Jens Høyrup
http://www.akira.ruc.dk/~jensh/

***L'Enseignement Mathématique*, Archive**
http://retro.seals.ch/digbib/vollist?UID=ensmat-001

Homepage of Prof. Leo Corry
http://www.tau.ac.il/~corry/

Opera Mathematica of Christoph Clavius
http://mathematics.library.nd.edu/clavius/

Geometrical books and instruments from 15th to 18th century
http://www.geometricum.com/

David Henderson' s Home Page [Educational and Historical Topics on Geometry]
http://www.math.cornell.edu/~dwh/

Archimedes Project [Some famous mathematical books of the Renaissance period are available on line, i.e. Pacioli's *Summa*]
http://archimedes2.mpiwg-berlin.mpg.de/archimedes_templates

Simon Stevin's *De Meetdaet* [The Practice of Measuring]
http://www.math.leidenuniv.nl/~wiskonst/meetdaet/index.html
and *The Principal Works of Simon Stevin*
http://www.historyofscience.nl/works_detail.cfm?RecordId=2702

Mathematical instruments
http://brunelleschi.imss.fi.it/museum/esim.asp?c=500164
and
http://web.mat.bham.ac.uk/C.J.Sangwin/Slide rules/sliderules.html
and
http://www.mhs.ox.ac.uk/epact/catalogue.php?ENumber=52265

We would like to provide a more comprehensive list of websites containing resources useful to researchers and students (not necessarily in English). If there are any you use, or you know are useful for students or researchers, please send your recommendations to the editors.

* * *

Notices

Proceedings HPM2004&ESU4: Empirical research on using history of mathematics in mathematics education

In 2001 Gulikers & Blom conducted a rather large survey of articles in ZDM concerning the use of history in mathematics education. As a conclusion they wrote in their ESM-paper:

> "Most publications are anecdotic and tell the story of one specific teacher, whereas it is unclear whether and how the (generally positive) experiences can be transferred to other teachers, classes and types of schools." (Gulikers & Blom, 2001, p. 223)

This quote may be read as an implicit statement about the lack of empirical research studies on the use of the history of mathematics in mathematics education. Also Siu touches upon this issue when he, in his paper in the proceedings HPM2004&ESU4, says that:

> "Papers on the value and role of history of mathematics in the learning and teaching of mathematics far outnumber those on the evaluation of the effectiveness of this claim." (Siu, 2007, p. 269)

Now, the special issue on history in mathematics education in ESM last year provided a few empirical studies and so did the special issue of MJRME in 2004 including proceedings from TSG-17 at ICME-10. However, scanning every possible journal since 2001 is a very time consuming task. So what may be done instead is to take a look at the revised proceedings HPM2004&ESU4 which came out last year. Taking this massive volume as a representative for the field in general may provide some insight into what the status is on conducting empirical research on the use of history in mathematics education.

Of course, empirical studies may concern other aspects than just the effectiveness of using history in mathematics education which Siu mentions. Out of a total of 78 papers in the volume I was able to identify 7 as being either clear-cut or somewhat empirical studies. In an article in the *Nordic Studies in Mathematics Education* (Nomad, 12(3)) last year, I discussed four of these more clear-cut, but very different, empirical studies. More precisely, it was the contributions of Smestad, Tzanakis & Kourloulos, Su, and Horng. Smestad's paper is an evaluation of the use of history in the international TIMSS video study. Tzanakis & Kourloulos report on a classroom experiment of introducing statistics in an historical manner to prospective primary school teachers. Su and Horng are concerned with mathematics in-service teachers' professional (HPM-) development in terms of applying history in their teaching. The discussion of the papers were carried out in terms of whether they were mostly concerned with the use of 'history as a tool' to support the learning and teaching of mathematical concepts, theories, notations, etc. or the use of 'history as a goal' in terms of illustrating (meta-) aspects of the evolution and development of mathematics. From Smestad's analysis of the TIMMS it is clear that most of the integration of history in the observed classrooms was carried out in terms of 'history as a goal'. Tzanakis' & Kourloulos' use of history in their experiment is, on the

other hand, concerned with using history as a tool. By designing 'guided research' activities for the students to carry out Tzanakis & Kourloulos are able to identify rough similarities between the historical development of statistical concepts and students' learning of and difficulties with these. And thereby, in the authors' own words, providing

> "some new input on the old, but still unsettled, issue of the parallelism between historical and ontogenetic development of mathematical knowledge [...]." (Tzanakis & Kourloulos, 2007, p. 294)

Su describes a longitudinal study of an in-service teacher's development when introduced to the history of mathematics and later designing worksheets and applying these in class. In both the teachers' own reflections, as presented by Su, as well as Su's description and analysis of the teacher's development elements of both history as a tool and as a goal are present. Horng, on the other hand, in his similar study of the teacher Yu, seems only to recognize history's value in terms of a tool. He concludes that Yu

> "recognizes that although HPM always has a role to play in teaching mathematics, teachers should regard student's learning as first priority. After all, the commitment of HPM is to help teaching mathematics efficiently." (Horng, 2007, p. 7 in pdf)

Saying that the commitment of HPM, as Horng does, is to help teaching mathematics more efficiently is, I believe, not the entire truth. As can be seen from Fasanelli's & Fauvel's introductory article in the proceedings the HPM Study Group of 1976 has eight 'principal aims' and only one of these, number 4, speaks of relating

> "the teaching of mathematics and the history of mathematics teaching to the development of mathematics in ways which assists the improvement of instruction and the development of curricula." (Fasanelli & Fauvel, 2007, p. xi)

The remaining ones speak, amongst others, about promoting international contacts and awareness of relevance, producing materials, facilitating access to materials, deepening the understanding of mathematics' evolution, and as number 8, promoting

> "awareness of the history of mathematics as a significant part of development of culture". (Fasanelli & Fauvel, 2007, p. xi)

Thus, out of the eight principal aims only two, number 4 and 8, are, or can be seen as, actual arguments for integrating history in mathematics education. And they are, in fact, examples of the two different types of arguments, or purposes, which you in general may argue that the use of history of mathematics in mathematics education may serve, namely 'history as a tool' and 'history as a goal' (Jankvist, 2007, pp. 90-92).

As an example of a place where 'history as a goal' plays a major role in mathematics education we may turn our attention to the Danish upper secondary school. Here the students, according to the official regulations, are to

> "demonstrate knowledge about the evolution of mathematics and its interaction with the historical, the scientific, and the cultural evolution". (UVM, 2007)

The official regulations for the Danish upper secondary mathematics programme are to some extent based on the Danish report on *Competencies and Learning of Mathematics* (title translated from Danish) where it says:

> "In the teaching of mathematics at the upper secondary level the students must acquire knowledge about the historical evolution within selected areas of the mathematics which is part of the level in question. The central forces in the historical evolution must be discussed including the influence from different areas of application. Through this the students must develop a knowledge and an understanding of mathematics as being created by human beings and, in fact, having undergone an historical evolution – and not just being something which has always been or suddenly arisen out of thin air." (Niss & Højgaard Jensen, 2002, p. 268, my translation from Danish)

Now, this clearly concerns 'history as a goal' rather than 'history as a tool'. As a matter of fact such an approach to the

integration of history of mathematics has been part of the Danish upper secondary mathematics programme since 1987. However, it still does not seem to be quite clear how to fulfill these goals. How would one go about testing whether or not the students actually acquire this kind of knowledge and understanding? And in what manner they are able to acquire it at all. For instance, in what way are their knowledge and understanding of the evolution and development of mathematics anchored in the related mathematical concepts, theories, etc.? Questions like these, it seems to me, are still open regarding the case of `history as a goal' in the Danish upper secondary mathematics programme. And they are questions which, if they are to be answered, call for empirical studies.

In conclusion: The proceedings HPM2004&ESU4 are rich in ideas and thoughts on why and how to integrate the history of mathematics into the teaching and learning of mathematics, what pieces of the history of mathematics to integrate, and when to do this. The proceedings also contain a few empirical studies on the use of history in mathematics education, some of them on evaluation of the effectiveness and some not. The papers concerning empirical research studies in the proceedings mainly deal with 'history as a tool'. If this is the case for the empirical research studies on using history in mathematics education as a whole, which it to my knowledge appears to be, then it seems to be somewhat paradoxical that the majority of the actual involvements of history in classrooms, as evident from Smestad's investigation of TIMMS, concern 'history as a goal'. Conferring the case of the Danish upper secondary mathematics programme, empirical studies on the use of 'history as a goal' are highly relevant as well.

There is no doubt that empirical research studies on the use of history in mathematics education are important, whether they concern 'history as a goal' or 'history as a tool', since they may tell us how positive experiences can be transferred from one teacher, class, or school to another. The studies of Tzanakis & Kourkoulos, Su, and Horng provide some insight into this problem area. Unfortunately, such studies are rare in the proceedings HPM2004&ESU4 and to a large extent the critique by Gulikers & Blom, as quoted earlier, still apply to the literature in the field. So regarding a real 'movement' in the HPM community towards more empirical research studies the proceedings does not seem to indicate such a thing. In an interview with one of the board members of HPM, Abraham Arcavi, which I conducted at the NoGSME summer school in Iceland in June 2007, I asked about this as well as what to expect in the future from HPM (and ESU). Arcavi revealed:

> "The community of HPM has been successful in at least two fronts: it called the attention to the potential of history of mathematics in mathematics education and it also provided a lively 'home' to learn from each other for all the professions (teachers, mathematics educators, mathematicians and historians) who work with history. However, HPM still needs much more empirical research on teaching and learning related to history than it is the case now, and there is no lack of research questions to pursue. This avenue is important in order to strengthen HPM both internally and externally. Internally, research, as I envision it, would provide insights which confirm, extend or challenge some of our assumptions and proposals, it may reveal directions not yet pursued and it would certainly sharpen our own views and future plans. Externally, research can be a way to reach out and communicate with other communities within mathematics education like PME, CERME, and others and would open opportunities for its themes to appear more in journals like ESM, JRME, JMB, and many others. Pursuing such opening of the current 'borders' will give history a wider stage and will be instrumental in attracting more people. Probably, HPM should aim at working in a similar way that other 'thematic' communities already do (such as technology in mathematics education, modelling, and the like) – they nurture inner meetings and discussions, but at the

same time they pursue a strong presence in general conferences (plenaries, working sessions, discussion groups) and publish in general journals. In my opinion, research is the main way to pursue a wider and visible presence which would make HPM stronger and ever growing."

An emphasis on empirical studies would, of course, not mean that research based on other research paradigms, for instance logical argumentation, would become unimportant. Having people come up with ideas and *thinking* about the use of history in mathematics education is still highly relevant. However, taking into consideration the vast amount of papers dealing with the non- or pre-empirical aspects of using history I believe that a shift in emphasis would be in order. As the reader probably knows, this summer HPM2008 will be held in Mexico City. Now, what to expect from this conference regarding further empirical research studies, I don't know. Hopefully there will be an increase. But the way things look now HPM still has a long journey ahead before it will become a research area the way PME, its sister permanent study group under ICME, is today.

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Uffe Thomas Jankvist, Denmark

* * *

Problématique-Some Questions on the Change of the Historical Role of the Ellipse's Foci

According to Apollonius, the ellipse is defined as a conic section [i.e. the way we know]; thereafter, he studies the properties of the various elements of this curve, defining the foci towards the end of his work.

Now, as we notice in grammar-school books, the ellipse is defined at first in the same way, but the curve itself is given a totally different treatment. To start with, one considers two points within the plane enclosed by the curve, thus defining a priori the foci of the ellipse through the known property. Thereafter, one introduces (or, deduces) the algebraic equation of the ellipse. Here, there is a huge arbitrariness and inconsistency in the instructor's approach: from pure geometry and curves directly to the foci and the pertinent equation.

Neither Descartes nor Euler had the foci of ellipse as a start concept.

We talk here with a) educational inconsistency and b) of three widely different conceptual approaches (Apollonius, Descartes/Euler, $19^{th}/20^{th}$ centuries).

Could it is worthwhile accounting for these historical and educational? More specifically, is it possible to be found why

foci of ellipse became so important? When, by whom and why? Which would be the best didactical approach to this delicate issue?

Nikos Kastanis, Greece

* * *

What is ICMI News?

ICMI News is the new Electronic Newsletter of the International Commission on Mathematical Instruction (ICMI). This newsletter aims to improve communication between ICMI and the worldwide community interested in mathematics education, informing about actions and recommendations of ICMI, highlighting issues that are under discussion and reporting about ongoing activities.

In addition, ICMI News will report on major activities by the ICMI Affiliated Study Groups (HPM, PME, IOWME, WFNMC and ICTMA), on major international events related to mathematics education and on other topics of general interest to the community of educational researchers, curriculum designers, educational policy makers, teachers of mathematics, mathematicians, mathematic educators and others interested in mathematical education around the world. Feedback from readers is welcome.

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Call for papers
Deadline for *Abstract submission*: 10 September, 2007. Abstracts should not exceed 500 words (approximately, one A4 page).
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Notification of acceptance: by 10 January, 2008.

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Aims and Focus

Nowadays, after the meaningful advance of the dialogue between history and mathematics education in different parts of the world and several aspects, it is possible to distinguish among at least three autonomous research fields led by this debate: the history of mathematics; the history of mathematics education and the history in mathematics education. The focus of the TSG 23 is just about the third of these fields, although the achievements in the first and second of these research fields have been conditioning the development of the specific debate in TSG 23. Thus, there is no doubt that some of the main difficulties for the establishment of dialogues between history and mathematics education, in all of its levels and aspects, are not just the access to historical sources, but also the production of new and more enlightening histories of mathematics and mathematics education. The ways how these dialogues can be established, especially from an educational perspective, are another difficulty. However, some processes and tools – as the edition of original sources and the information and communication technologies (ICT) – seem to contribute partially to attenuate the first difficulty. Concerning the second, it is through researches, experiments, meetings and debates that these dialogues can become relevant and efficient, chiefly to school practices involving mathematics.

In fact, the history of mathematics and mathematics education, as well as their use in all levels and aspects of mathematics education is becoming extensive everywhere in the world. All the meetings, conferences, summer schools, seminars devoted to mathematics education offer opportunities to discuss and debate this topic.

Several aims are pointed to the establishment of dialogues between history and mathematics education, and many ways are used to reach these aims. Among them, we can mention:

- to humanize the mathematics education conceiving it as a historical, social and cultural production, as well as a set of particular social activities which are related to other social activities;
- to make student understand the meanings of aims, values, concepts, methods and proofs in different social practices involving mathematics;
- To develop the learners' citizenship feeling, problematizing school mathematical social practices in a historico-critical point of view and maintaining an open attitude towards the study of mathematical practices in different geopolitical, institutional and chronological contexts.

To reach these aims, researchers and teachers pursue different ways and try to give theoretical and epistemological foundations to the use of the history of mathematics and mathematical education in their teaching. In spite of these efforts, several issues are still open and deserve to be discussed. Among them:

- What kind of proposals, strategies and pedagogical practices have been relevant and useful to the establishment of fruitful dialogues between history and mathematics education in different countries, contexts and levels, chiefly in the mathematics teachers' education?
- How and why the integration of history of mathematics in mathematics education has been differently valued in the school curricula of several countries and regions?
- On what kind of political, philosophical, sociological, anthropological, psychological and linguistic bases and theoretical perspectives the integration of history in mathematics education has been conceived?
- To what extent the production of new and more enlightening histories of mathematics and mathematics education could contribute and promote new ways of establishing dialogues between history and mathematics education?
- Which place does the history of mathematics occupy in mathematics textbooks of different countries?
- Which place do the historical mathematics textbooks occupy in the

mathematics' teachers education in different countries?

- How the ICT and Internet can help to promote dialogues between history and school mathematics education?
- Which non standards media can be used to promote dialogues between history and school mathematics education?

In the sessions devoted to this TSG 23, we hope to gather different actors of mathematics education, researchers, historians, teachers … to discuss and shed light on these questions. The final programme is announced on the web April 20, 2008.

Programme

Our TSG has been allotted two one-hour sessions and one ninety-minute session in the Congress.

Each of the first three sessions will be spent in listening to oral contributions and engaging in follow-up discussion. In addition, some time may also be available for discussing issues raised by contributions through written contributions. Especially, if the number of contributions to this group is big enough for the group to split into smaller subgroups in the previous sessions, the first and the last sessions will be plenary.

At least part of the last session will be reserved for reporting and summarizing the discussions of the previous sessions.

Website:
http://tsg.icme11.org/tsg/show/24

HPM 2008

History and Pedagogy of Mathematics
The HPM Satellite Meeting of ICME 11
July 14-18, 2008
Mexico City, Mexico
See First Announcement in Newsletter 66.

10th Iranian Mathematics Education Conference (IMEC-10)

August 12-15, 2008
Yazd, Iran
Aims: To expand the mathematical awareness in general and to exchange the mathematical education experiences in particular.

Scientific Programs

- Plenary talks
- Paper presentations
- Workshops
- Panels
- Exhibitions

Conference Themes

1- Theoretical foundations of mathematics education.
2- Professional development of mathematics teachers.

The Scientific Committee is pleased to announce that all the local expenses (except air fare) of foreign participants will be taken care by the local organizers of the 10th IMEC.

Important Dates:
Registration & submission of contributions (Papers, exhibition. etc): April 30, 2008
Website: http://www.imec10yazd.com

Models in Developing Mathematics Education (10th International Conference of The Mathematics Education into the 21st Century Project)

September 12-18, 2008
Dresden, Germany
For further information contact
arogerson@inetia.pl

Models in Developing Mathematics Education

September 11–17, 2009
Dresden, Germany

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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.

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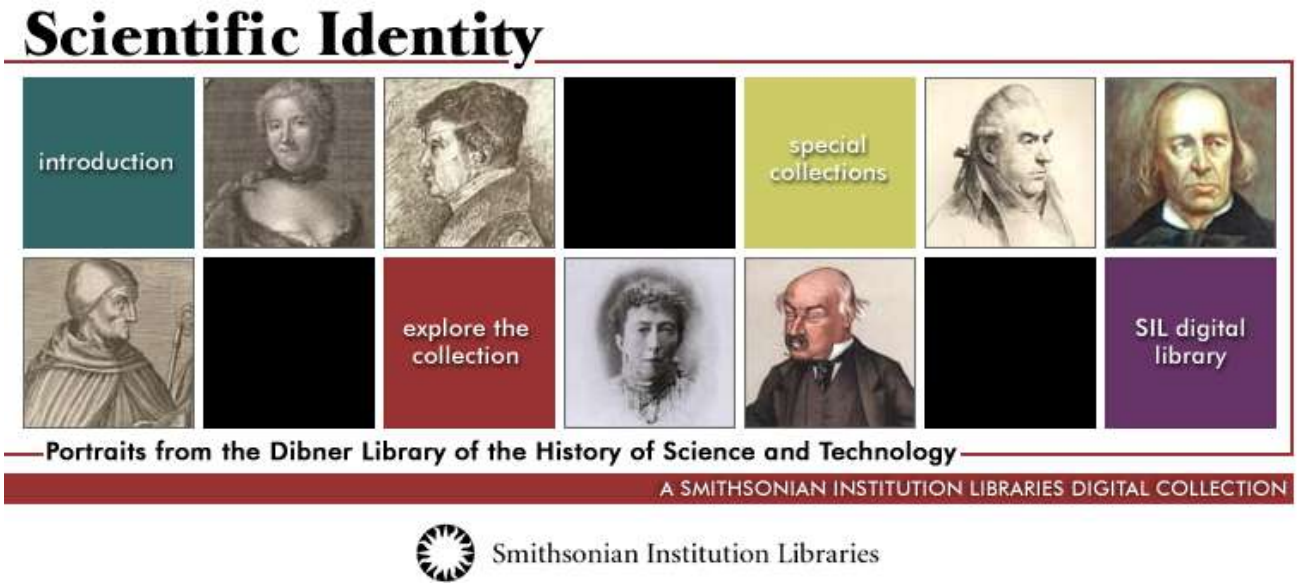

http://www.sil.si.edu/digitalcollections/hst/scientific-identity/index.htm

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

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No.	Deadline for material	Sent to distributors
68	7 June 2008	1 July 2008
69	12 October 2008	1 November 2008
70	12 February 2009	1 March 2009

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