ICMI

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on
Mathematical Instruction

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The International Commission on Mathematical Instruction

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Table of Contents

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Legend: IMU stands for *The International Mathematical Union.*

Report on

ICMI activities in 1997

1. Organisation

The Executive Committee had its third meeting in Madrid on 31st August - 1st September 1997. Beside in meetings, the work of the EC is conducted by correspondence and electronic communication under the direction of the President and the Secretary.

As of 1st January 1997, *Latvia* and *Uruguay* have been adopted as new members of IMU and hence of ICMI as well. Also ICMI continues to receive applications from countries to be co-opted as non-IMU member states of ICMI in accordance with the terms of reference. In 1997 it was decided, with the endorsement of the International Mathematical Union, to co-opt *Indonesia* as a non-IMU member of ICMI. The Adhering Organisation is the Indonesian Mathematical Society. Other applications were considered by the EC in 1997. Final decisions are expected to be made in 1998.

A number of countries have not (yet) appointed National Representatives in ICMI. These are Georgia, Greece, Latvia, Mexico, Pakistan, Romania, Slovenia, and Uruguay.

It is part of ICMI's general policy to encourage member states to establish National Sub-Commissions of ICMI. In 1997 the EC was not informed of the establishment of new National Sub-Commissions.

2. ICMEs

The next International Congress on Mathematical Education, *ICME-9*, will be held in Makuhari, Chiba, Japan, in 2000. Preliminary dates are 31 July to 7 August. An International Programme Committee was appointed in 1996. It is chaired by Professor Hiroshi Fujita, Meiji University, Tokyo, Japan. The list of members was published in the ICMI Bulletin No. 42, June 1997, p. 17. The IPC has been working for most of 1997 by means of electronic post under the direction of Professor Fujita. The IPC will meet for the first time in the beginning of March 1998.

No official bids have been received by the Executive Committee with respect to ICME-10 in 2004. However, Brazil has produced a declaration of intent to let ICMI know that it is preparing a bid to host this Congress.

3. ICMI Studies

The mounting and conducting of so-called ICMI studies on crucial themes and issues in mathematics education were continued in 1997. The ICMI studies are published by Kluwer Academic Publishers, Dordrecht, the Netherlands, under the general editorship of the President and the Secretary of ICMI.

The study *Mathematics Education as a Research Domain: A Search for Identity. An ICMI Study*, based mainly on the study conference *What is Research in Mathematics*

Education, and What Are Its Results?, held at University of Maryland, College Park, USA, May 1994, appeared, in two volumes (576 pages), at the beginning of 1998. The study is edited by Anna Sierpinska and Jeremy Kilpatrick.

The manuscript for the study on *Perspectives on the Teaching of Geometry for the 21st Century*, the corresponding study conference of which was held at Università di Catania, Italy, September-October 1995, was sent to the publisher in the autumn of 1997. The study, edited by Vinicio Villani and Carmelo Mammana, will appear in the beginning of 1998.

The next study in the series is devoted to the theme *The Role of the History of Mathematics in the Teaching and Learning of Mathematics*. An International Programme Committee was appointed in 1996 (a list of members' names was published in the ICMI Bulletin, No. 41, December 1996, p. 14) with John Fauvel, the Open University, UK, and Jan van Maanen, the University of Groningen, the Netherlands as co-chairs. The Discussion Document for this study was published in various journals and newsletters, including the ICMI Bulletin, No. 42, June 1997, pp. 9-16, and in an abbreviated version in *L'Enseignement mathématique*, 2e Série, t. 43, fasc 1-2, janvier-juin 1997, pp. 199-203. The study conference will be held in France, at CIRM, Luminy (near Marseille), 20-25 April 1998, with Jean-Luc Dorier, Grenoble, France, in charge of the Local Organisation.
Moreover, the ICMI EC has mounted a study on the *Teaching and Learning of Mathematics at University Level*. The IPC which was appointed in 1997 (a list of members' names is included in the ICMI Bulletin, No. 42, June 1997, p. 18) is chaired by Derek Holton, University of Otago, Dunedin, New Zealand. The Discussion Document for this study has been/will be published in numerous places, including the ICMI Bulletin, No. 43, December 1997, pp. 3-13, and *L'Enseignement mathématique*, 2e Série, t. 43, fasc. 3-4, juillet-décembre 1997, pp. 381-390. The corresponding study conference will take place in Singapore, 8-12 December 1998.

Plans for further studies, on average one per year, are under development.

4. Regional Conferences
No ICMI Regional Conferences were held in 1997. The next such meeting, The First ICMI East Asia Regional Conference on Mathematics Education (ICMI-EARCOME 1), will be held in Chungbuk, The Republic of Korea, 17-21 August 1998.

5. Affiliated Study Groups
ICMI continues to have four affiliated study groups, *HPM* (The International Study Group for the Relations Between the History and Pedagogy of Mathematics), *IOWME* (The International Organisation of Women and Mathematics Education), and *PME* (The International Group for the Psychology of Learning Mathematics), and *WFNMC* (The World Federation of National Mathematical Competitions).

6. The Solidarity Programme
In 1992 ICMI established a Solidarity Programme to help the development of mathematics education in countries in which there is a need for it that justifies international assistance. The first stage in this programme was the mounting of a

Solidarity Fund based on private contributions by individuals, associations, etc. The Fund is to be activated to support concrete initiatives and activities that may foster solidarity in mathematics education between well-defined quarters in developed and less developed countries. The Solidarity Fund has received donations from various organisations and individuals in mathematics education for which it is most grateful. Thus, in 1997 the Fund received a donation of French Francs 5.000 from the French National Sub-Commission of ICMI, C.F.E.M. In 1997 no projects were supported by the Solidarity Fund. Although the total funds are not excessive, the ICMI EC would welcome applications concerning projects which are worthy of support in line with the general aims of the Fund.

7. ICMI WMY 2000 Committee

In order to consider, plan and prepare the main aspects of ICMI's involvement in the World Mathematical Year 2000, an *ad hoc* committee, ICMI WMY 2000 Committee, has been formed, under the chairmanship of ICMI's President, Professor Miguel de Guzmán. The other members are listed in the ICMI Bulletin No. 42, June 1997, pp. 18-19.

8. ICMI Bulletins

In 1997, ICMI Bulletin Nos. 42 and 43 were published under the editorship of the Secretary of ICMI. Furthermore, the ICMI Bulletin is available in the following electronic forms: In ASCII-format on direct request to the editor. On the World Wide Web, where it can be found under the following coordinates on the IMU-server, through URL:

http://elib.zib.de/imu.icmi.bull.[no.]

or

http://elib.zib.de/imu/icmi/bulletin/no

9. ICMI on WWW

Since the end of 1995, information concerning ICMI can be found on the ICMI-pages of the IMU-server on the World Wide Web. The pages are located through URL:

http://elib.zib.de/imu.icmi

Mogens Niss, Secretary, 26 January 1998
Roskilde University, Roskilde, Denmark

ICMI Accounts 1997:

1 January - 31 December

Swiss Franc Account:

Income:	
balance 1996	153.727,54
IMU (Schedule A: Administration)	11.000,00
IMU (Schedule B: Scientific Activities)	22.000,00
interest	173,83
total	186.901,37

Expenditure:	
transfer charges	22,29
transfer to DKR Account	19.000,00
return to IMU[1)]	6.000,00
ICMI balance 1997	**161.879,08**
total	186.901,37

Den Danske Bank exchange rate, ult. 1997: 1 CHF = 0,69 US$

Danish Kroner Account:

Income:	
ICMI balance 1996	5.261,04
transfer from Swiss Francs account (22.810,50, 18.655,20, 47.218,00)	88.683,70
transfer from USD account	1.640,40
total	95.585,14

Expenditure:	
ICME-8 Grants Committee follow-up meeting	1.175,00
EC meeting in Madrid, members' accommodation	12.298,82
EC meeting in Madrid, local expenses	4.923,26
EC meeting in Madrid, members' travel expenses	9.613,77
EC meeting in Madrid, President's miscellaneous expenses	1.590,40
EC meeting in Madrid, Secretary's miscellaneous expenses	645,00
ICMI Study on Univ. Maths., IPC meeting in Worthing, members' accomodation etc.	10.036,15
ICMI Study on Univ. Maths., IPC meeting, members' travel expenses	8.792,91
typing of Bulletin 42 & 43	2.040,00
credit card charge	150,00
transfer charges	113,80
ICMI Balance 1997	**44.206,03**
total	95.585,14

Den Danske Bank exchange rate, ult. 1997: 1 DKR = 0,15 US$

Sterling Account:

Income:	
balance 1996	16.352,30
CUP royalties for studies	21,60
interest	664,72
total	17.038,62

Expenditure:	
ICMI Study on Univ. Maths., IPC meeting in Worthing, member's air fare	1.311,00
ICMI Study on Univ. Maths., IPC meeting in Worthing, members' accommodation etc.	888,17
ICMI Study on Univ. Maths., IPC meeting in Worthing, chair's expenses	50,10
transfer charges	16,22
ICMI balance 1997	**14.773,13**
total	17.038,62

Den Danske Bank exchange rate, ult. 1997: 1 GBP = 1,66 US$

US$ Account:

Income:	
ICMI balance[2] 1996	13.747,24
Solidarity Fund balance[2] 1996	*33.655,84*
ICMI interest, 29% of total (corresponding to 1997 balance share)	413,58
Solidarity Fund interest, 71% of total (corresponding to 1997 balance share)	1.012,57
Contribution to the **Solidarity Fund,** by the C.F.E.M.[3]	846,30
total	49.675,53

Expenditure:	
EC meeting in Madrid, members' air fares	4.273,40
ICMI Study on History, IPC member's travel expenses	438,00
transfer to DKR account	242,97
transfer charges	19,14
Solidarity Fund balance 1997	*35.514,71*
ICMI balance 1997	**9.187,31**
(account balance	44.702,02)
total	49.675,53

Notes:

1. IMU generously contributed a grant of CHF 12.000 to support of ICME-8 held in Sevilla in 1996. Unfortunately, it turned out not to be possible to spend this sum according to the conditions set for the grant. However, IMU kindly agreed to grant half of the amount to the forthcoming ICMI Study on *The Role of The History of Mathematics in the Teaching and Learning of Mathematics*. Hence, the remaining sum was returned to IMU.

2. As a consequence of the ICMI General Assembly and Executive Committee meetings held in Québec, August 1992, it was decided to establish an ICMI Solidarity Fund based on private contributions. The **Solidarity Fund** was mounted to assist mathematics education and mathematics educators in less affluent countries. Its money can only be spent (by a committee chaired by Professor Jean-Pierre Kahane) to serve such purposes and is therefore **not** part of ICMI's general resources. However, the appearance of the Solidarity Fund on the ICMI accounts for 1997 is due to the wish to keep ICMI's number of different bank accounts low. The accounts exhibit the ICMI balances and the Solidarity

Fund balances separately. As of 1996 the Solidarity Fund balances were all concentrated in the US Dollar Account.

3. In 1997, the French National Sub-Commission of ICMI (C.F.E.M), generously made a donation of French Francs 5.000 to the Solidarity Fund.

4. In addition to the amounts displayed directly in the accounts, considerable extra sums should appear but do not and cannot. In 1995 Roskilde University (the Secretary's home institution) has contributed a substantial support to ICMI's work (e.g. telephone and -fax, e-mail facilities, postage, all the printing and distribution costs of the Bulletin, plus secretarial help of various sorts). It is estimated that the total contribution of Roskilde University is equivalent about US$ 5.000. The ICMI Executive Committee expresses its gratitude for this generous support.

The Executive Committee's thanks also go to the institutions of its other members. These institutions, too, have given invisible support to ICMI's work in a variety of ways. For instance, in many cases these institutions have paid travel and other expenses related to participation in EC meetings and soforth.

Mogens Niss
26 January 1998

The Swedish Committee for Mathematical Education ICMI-Sweden

The National Committee for Mathematics at the Royal Swedish Academy of Science has set up a committee for mathematical education. The purpose is to work for an improved education in mathematics at all levels at school and at colleges and universities. The aims are to generate an increased interest in mathematics amongst pupils and students and an improved recruitment to studies in mathematics in upper secondary school and in universities.

The committee for education consists of ten members who, as a whole, possess broad experience of mathematical education at all levels. The chairman of the Swedish Committee for Mathematical Education is Professor Hans Wallin of Umeå University.

International role
At the international level, the committee for education functions as a sub-committee of the International Commission on Mathematical Instruction (ICMI). In this context, the committee is called ICMI-Sweden. The task of ICMI-Sweden is to encourage Swedish participation in the activities of ICMI and to spread information about ICMI and its work in Sweden.

Tasks
As stated, the committee for education is to work for improvements of the mathematical education at all levels, from pre-school to postgraduate studies. It is also to contribute to public discussion of mathematical education in primary and secondary school and in colleges and universities. A particularly important objective of the committee is to tear down the wall that has emerged between primary and secondary school, on the one hand, and universities, on the other hand, in the field of mathematical education.

The most important resource for good mathematical education is well educated teachers. The quality of the training of mathematics teachers is decisive for the improvement of mathematical education. The committee for education will therefore work for teacher training of high standards. The committee will also promote research in the didactics of mathematics which is in progress in Sweden. Yet another task will be to stimulate discussion of the role of mathematics in society.

Cooperation with other organizations
The committee for education cooperates with other organizations of mathematics teachers and of mathematicians. It is involved in a continuous discussion of different issues with the Swedish Ministry of Education and Cultural Affairs, the Board of Education and the National Agency for Higher Education. Measures proposed by these authorities are submitted to the committee for consideration.

Activities
The committee for education was formed in November 1996. The first more visible

activity will be a course which will be held at the well-known Mittag-Leffler Institute outside Stockholm later this year. The course is called "Gilt-edged mathematics" and is addressed primarily to upper secondary school teachers. One of the main purposes of the course is to foster opportunities for contacts between upper secondary school teachers and people who do research in mathematics.

During the last year, there has been a lively discussion in the newspapers and in other contexts on the insufficient previous training in mathematics among first year students at Swedish universities of technology. The members of the committee have participated in this discussion in different ways.

The committee has had informal contacts with ministries and authorities in order to influence current issues, such as the development of curricula for compulsory school, the reform of postgraduate studies, and the overhaul of the teacher's training, which have been initiated by the Swedish Parliament.

A resource centre for the didactics of mathematics is being established. It is accessible on the Internet.

Terms of reference

1. Tasks
The Swedish Committee for Mathematical Education, ICMI-Sweden, constituted by decision of the Swedish National Committee for Mathematics, on the 27th of November 1996, has the following tasks:

- to initiate and maintain a discussion of the role of mathematics in society and of the aims for mathematical education at all levels in school and in colleges and universities;

- to function as a link between ICMI, the International Commission on Mathematical Instruction, and people who work with mathematical education in Sweden, in order to disseminate knowledge of the activities of ICMI, and to encourage Swedish contributions to these;

- to support the growth of research and development work in the didactics of mathematics in Sweden;

- to contribute to increased international contacts among groups in Sweden which are engaged in mathematical education;

- to create a forum that serves to increase the contacts and the exchange of thoughts between mathematics teachers at school, and those working in teacher training programs, at colleges and at universities;

- to assist in identifying problems in mathematical education, and in mapping and analyzing deficiencies in the recruitment for studies in mathematics at upper secondary school level and for undergraduate and postgraduate studies at university

level;

- to spread knowledge of good examples of, and successful methods for, improvements of the quality of mathematical education and the recruitment to it.

2. Connections with other organizations
The Swedish Committee for Mathematical Education is associated with the international organization ICMI which, in turn, is a commission within IMU, the International Mathematical Union. The Swedish Committee for Mathematical Education cooperates with the Swedish National Committee for Mathematics on issues that are of mutual interest.

3. Constitution
The Swedish Committee for Mathematical Education consists of a minimum of 7 and a maximum of 12 members. These are either mathematics teachers at primary or secondary school, or in teacher training or postgraduate programs, or are engaged in research in the field of mathematics.

The committee is elected by the Swedish National Committee for Mathematics for a period of four years. The National Committee appoints one of its members as Chairman.

Additional information about ICMI-Sweden may be obtained from its secretary, Gerd Brandell, gerd@sm.luth.se.

Gerd Brandell, National Representative of Sweden on ICMI
Luleå Technical University

New ICMI Studies

Mathematics Education as a Research Domain: A Search for Identity
The ICMI Study publication based on the Study titled *What Is Research in Mathematics Education, and What Are Its Results* has now appeared, in two volumes, under the above title and edited by Anna Sierpinska and Jeremy Kilpatrick. The Study is published by Kluwer Academic Publishers, Dordrecht (the Netherlands). An advertisement is presented on the next page of this Bulletin. It should be noted that *any individual* may purchase the paperback edition of this Study at a considerably *reduced rate* (i.e. 134 Dutch guilders for the set instead of 200) if ordered through ICMI. If you want to take advantage of this opportunity, please contact the Secretary of ICMI at the address indicated elsewhere in this Bulletin and you will receive a special order form.

Perspectives on the Teaching of Geometry for the 21st Century
The ICMI Study volume of the Study with the title indicated has now appeared, pubnlished by Kluwer Academic Publishers, Dordrecht (the Netherlands), under the editorship of Carmelo Mammana and Vinicio Villani. An advertisement is presented on page 15 of this Bulletin. It should be noted that *any individual* may purchase the paperback edition of this Study at a considerably *reduced rate* (i.e. 80 Dutch guilders instead of 120) if ordered through ICMI. If you want to take advantage of this opportunity, please contact the Secretary of ICMI at the address indicated elsewhere in this Bulletin and you will receive a special order form.

The Teaching and Learning of Mathematics at University Level
The so-called Discussion Document for this Study was published in the previous issue (No. 43) of this Bulletin. The Study conference will be held in Singapore 8-12 December 1998. Participation is by invitation only. Updated information about this Study can be found on the World Wide Web, at

http://www.nie.ac.sg:8000/~wwwmath/icmi

Mogens Niss

'Math War' Developments in the United States (California)

Jerry P. Becker and Bill Jacob

Introduction

If there was ever a time in the United States when no one cared aboutmathematics education, it certainly has not been the past couple years. Mathematics education has been written about in the local, regional, andmost important national newspapers and magazines. Reports have also appeared on radio and national television. The focus of attention has been the so-called "Math Wars" that center on reform in the school mathematics curriculum and its teaching. In particular, a "backlash" against the California Mathematics Framework and the National Council of Teachers of Mathematics' (NCTM) Standards in California has been prominent in the news.

California is the largest among the 50 states. By virtue of its size, it has a very significant influence on school textbook and test publishers. Controversies in education - philosophical, political or social - that come up in California can presage similar controversies and trends in other states. Thus, there is great interest throughout the United States in what transpires in California. As a consequence, and because the 1992 California Mathematics Framework is consistent with or fits closely with the NCTM's Standards, the NCTM has a great interest in these developments in California; in fact, its Standards (currently undergoing revision) have been the focus of much expression of unrest.

The so-called battlefields for the California math war extend beyond concerned parents meeting with teachers and school boards. Involved are state education agencies, their advisory panels, and ultimately the state legislature. As one might expect, newspaper accounts capture only a small part of a rather complex story, so we shall try to provide a few more details here.

Background

Like other states, California has a State Board of Education (SBE). Its members are appointed by the Governor of the state, subject to the approval of the state legislature. There is also a Superintendent of Public Instruction (SPI). This person is elected by popular vote and is the head of the California Department of Education (CDE). [Presently the Governor and the SPI are from different political parties.] The function of the CDE is to provide administrative support for various groups and agencies, implement the policies set by the SBE, prepare and disseminate documents, and provide information to citizens, school districts, and the public.

Due to recent changes in California, however, the curriculum standards, frameworks, and adoptions of instructional materials for the schools now fall under the purview of the SBE, not the SPI. The SBE appoints a Curriculum Commission (CC) whose job is to supervise the drafting of frameworks and instructional materials criteria, recommend instructional materials for state-wide adoption, and make policy recom-

mendations to the SBE. Its members are mainly K - 12 teachers, with a few administrators or representatives from higher education. The SBE also appoints (using CC recommendations) members for framework committees and instructional resources evaluation panels (IREP). The mathematics framework committee spends about a year drafting the curricular framework and materials criteria, which is revised by the CC and then submitted to the the SBE for approval. The IREP spends four months reviewing instructional materials submitted for adoption, comparing them against SBE adopted criteria. For details about the materials adoption process and further background, see Jacob (1998).

Standards are new to California. Prior to the SBE approval of the new mathematics standards last December, the state only had curriculum frameworks. Standards that are established at the state level for the schools are voluntary. However, California has established a new testing program for the entire state that must be aligned with the new state standards in 1999. So in reality, the tests will induce districts to adhere to and follow the standards. The standards are drafted by the Standards Commission (SC, which is unrelated to the SBE, CDE, or the CC), whose members are appointed directly by the Governor, the SPI, and the legislature, and what they develop must be approved by SBE.

The period 1985 - 1997

The California SBE adopted a new Mathematics Framework in 1985. Many ideas in the new framework were new to teachers, as well as to publishers of school textbooks, for in the next year the CC rejected all commercially published materials that were submitted for consideration for adoption in California's schools as none of them met new criteria established by the SBE. In 1987, the CDE published the Mathematics Model Curriculum Guide (CDE, 1987) which included 88 pages devoted to "teaching for understanding" with classroom examples. This document clarified many themes from the Framework and historically proved to be quite influencial, both for teachers interested in change and textbook developers. Also, "state replacement units" were made available to teachers so they could try out some of the new approaches and so textbook companies would have models to consider. However, until 1995, because of the failed adoption, the curricular materials used by nearly all California K - 8 teachers remained almost identical to those sold during the early 1980's. In 1992 a new Mathematics Framework and criteria were approved by the SBE. This new policy document is still in place and is a central ingredient in the the raging controversy that exists at this time.

California developed its own state-wide testing program during the early 1990's (the California Learning Assessment System/CLAS) and this performance-based exam was field tested in 1993 and administered state-wide in 1994. But some of the free response questions on CLAS were considered controversial and the Governor vetoed funding for the program, resulting in a three-year gap in the state's testing program. California's test results in 1993 and 1994 were poor and they were confirmed by the results of the National Assessment of Educational Progress, in which California ranked 41st out of 43 states. This led to an attack on the 1992 California Framework. Well-organized groups claimed that emphasis on cooperative learning, problem solving and applications of mathematics diminished the importance of individual accountabili-

ty and the importance of mastering basic computational skills (NCTM, 1998). The concern about the "failed reform" led the state legislature to enact a new law (A.B. 170) in 1995 requiring the SBE to adopt instructional materials that are "based on the fundamental skills, ... including basic computation skills." By the summer of 1995 the verdict was clear, the 1992 Mathematics Framework had failed. The timing was amazing. In September 1995 [1] for the first time in over a decade, new instructional materials in alignment with the Framework became available for state-wide use in grades K - 8.

During 1995 and 1996, the SBE became quite active in mathematics, producing a "Program Advisory" in July 1996 that called for a "balance of basic skills, conceptual understanding, and problem solving" in mathematics education. And in November of 1996 the SBE appointed a new framework committee - it rejected the majority of the CC's nominees to that committee and added fourteen others recommended by a recent appointee to the SBE, a person who holds views of mathematics teaching and learning very much at odds with the recommendations in the 1992 Framework. In 1997 the framework committee met, developed and sent a draft document to the CC with all eight CC-recommended framework members voting against it. Central features of the draft were a listing of topics required at each grade level and an elimination of all discussion of pedagogy.

In a supplemental adoption (September 1997), the SBE rejected two programs highly recommended by the CC (both were NSF-funded curriculum development projects) citing mathematical errors and other problems. Examples of mathematical errors noted by the SBE included writing "ratios instead of fractions" and a number theory mistake that "30 divides the product 36x45" which the SBE explains in their written report is an error because "30 is not a factor of either 36 or 45". A middle school program that included a "pizza pirate" in a story problem was cited as violating the states patriotism and morality code. (For details see Nicholas (1997) or Jacob (1998)).

The Standards Commission (SC) approved the school mathematics (K - 12) standards in September, 1997, after a year of deliberation and considering public reactions to the document. In fact, the Commission's standards were substantially revised during July and August as a result of public comment, and the rapidity of these last-minute changes resulted in some glitches that both sides of the debate critcized and worked to correct during the Fall. The SBE adopted a substantially revised document in December, relying almost solely on the work of four Stanford University mathematics professors. They claimed the revisions were necessary to increase the "mathematical precision" in the statements of the standards and to remove the "Clarifications and Examples" whose purpose was to illustrate what the standards mean in the classroom, but were interpreted as "prescribing pedagogy" by the SBE. The process by which this document was approved, and the content of it, are major factors in the controversy that presently rages.

Impressions given by the mass media

While the media has tried to make sense of the debate that surrounded the controversial developments, it seems that they would not or could not get to the heart of each side's position. Typical news reports stated that the controversy was over "the

best way to teach math" and that the arguments over teaching were about such issues as "uses of real-world problems vs. skills" or "integrated vs. traditional curriculum". While on the surface such statements are not incorrect, they miss the central issues. The Framework committee agreed not to "prescribe pedagogy" in its document, but could not come to agreement, or even agree on a format to discuss, how to balance skills with problem solving. Even with pedagogy off the table, the committee could not agree on content. In their written "homework" (and therefore, public documents) for the committee on "How to balance K - 6 Mathematics," two northern California mathematics professors offered contrasting views: "the curriculum should include extended projects or capstone problems that require the student to synthesize and integrate concepts and calculational techniques", and "I suggest that our goals and expectations of elementary school children should be pretty much limited to arithmetic" (CFIR, 1997). How mathematical questions could be posed in the document was particularly problematic. For example, describing an area problem on a geoboard was rejected by the committee majority for two reasons: it "prescribed manipulative pedagogy" and "the appropriate tools for geometry are the straightedge and compass." Disagreement arose over appropriate use of calculators and technology. The media has by-and-large bypassed these central controversies.

The press reports on the Standards debate (see Wu, 1998) usually reduce the question to high standards vs. low standards. SPI Delaine Eastin's quote that the SBE "dumbed down" the CS's standards received prominent coverage, as did the SBE's statements that it is "removing pedagogy from the document" and striving for "greater accuracy". But here again, while publicizing each side's favorite "one-liners", the press has failed to dig out the basic differences over content. Central issues included the SBE's consistent removal of such phrases as "estimate" or "explain" and replacing them with "calculate," the removal of the study of patterns from the Algebra and Functions strand in elementary school, or the complete removal of all exemplars that were designed to help K -12 educators (and text designers) understand how topics are to be approached at a given grade level. The press seemingly never examines why both sides claim their views represent "high standards". Does moving mastery of computational skills to a lower grade level raise standards? Or, does adding an expectation that students explain what a number procedure means geometrically raise standards? However one views the situation, these actions by the SBE have seemingly established California as the center of the opposition to the NCTM's Standards-based reform. Due to many factors, the media a prominent one, many parents, policy makers and some teachers and professors came to the view that the 1992 Framework had failed. Following this thinking, therefore the NCTM Standards were also wrong and could be regarded as the culprit (Ross, 1998).

Research

An important factor in the California debate is the requirement that state-adopted instructional materials "incorporate principles of instruction reflective of current and confirmed research" (CA Education Code 60200c-3). The SBE invited Prof. E. D. Hirsch to speak on this issue in April 1997. In the written version of his comments, he described "mainstream educational research" as found in "journals such as the Educational Researcher" explicitly stating "This is a situation that is reminiscent of what happened to biology in the Soviet Union under the domination of Lysenkoism,

which is a theory that bears similarities to constructivism." (Hirsch, 1997, p. 3) After some explanation, Hirsch continues: "I shall briefly outline the conflicts between educational Lysenkoism and mainstream science in testing, math, and early education ...," and citing math education experts Anderson, Geary, and Siegler about what research shows math students need, "They would tell you that only through intelligently directed and repeated practice, leading to fast, automatic recall of math facts, and facility in computation and algebraic manipulation can one do well at real-world problem solving" (Hirsch, 1997, p. 6). Hirsch received a standing ovation from the SBE, and indications are that it is proceeding, based on his recommendations.

In spite of the SBE instructions to base the Framework on research, the Framework committee never discussed any research articles. In July 1997 the SBE awarded a contract to Prof. Douglas Carnine to provide a review of high quality mathematics research upon which the Framework's instructional strategies would be based. In this document, presented to the SBE in March (see Dixon, (1998)), we find "From a total of 8,727 published studies of mathematics in elementary and secondary schools ... only 110 passed the multi-level evaluation criteria we developed to identify high quality studies". All studies are experimental, most consider interventions over very short time intervals, many deal with learning disabled students, and many use "instructional booklets" in order to eliminate teacher-pupil or pupil-pupil interaction (which were considered "confounding variables".)

The American Educational Research Association's Special Interest Group for Research in Mathematics Education has written a public letter to the SBE (signed by 73 researchers) protesting the poor design of the Carnine report. But in spite of numerous errors (for example incorrect reporting of grade levels, content, or experimental design), the SBE will prepare new statements on "math instructional strategies" for inclusion in the Framework this summer, based upon the Carnine document. Due to the lack of time, the CC will not be able to participate in this part of the process. Various observers anticipate an endorsement of direct instruction - followed by repeated practice, opposition to having students try to develop ideas through problem solving, and quite possibly (based upon Carnine's work) discontinuation of the use of manipulatives in elementary schools (since they interfere with automaticity in fast recall).

Some observations about the two sets ofstandards

In California, as noted above, there were two sets of standards - those developed by the SC and the revision of that set under the supervision of the SBE. To observe that these two standards were the focii of unabated interest, across the land and for many months, is an understatement! For example, the NCTM devoted the front page of one issue of its News Bulletin to unflattering comments about the SBE's revised standards. (NCTM, 1998) Wu (1998) reported that "The reaction to the revision was swift and violent" (p. 1).

To illustrate the changes between these two documents we consider the original third grade Number Sense section where one has "[2.2] build up multiplication table from 0x0 to 10x10 and commit to memory," which has in its corresponding Clarification and

Example column: "Students see that understanding properties and relationships within the multiplication table can assist them in memorizing facts (e.g., 4 x 7 = 7 x 4; 7 x 6 is easy if you know 7 x 3 and know that you can double it to get 7 x 6, etc.)" In its revision, the SBE replaces these with "[2.2] Memorize to automaticity the multiplication table for numbers between 1 and 10". In Grade 7, where preparation for grade 8 algebra has became a central Standards and Framework objective, we find the SC's Algebra and Functions standard including "[3.2] generalize numerical and geometric patterns using algebra, and relate the equation, graph and table of values resulting from the generalization." The Board revised this standard to read "[3.2] plot the values from the volumes of a 3-D shape for various values of its edge lengths." As with the Framework, one finds that discussion of students' learning of mathematical relationships (like the use of commutativity to facilitate learning basic facts) was eliminated either because they "prescribed pedagogy" or "lacked precision".

University of California, Berkeley mathematics Professor H. Wu prepared a paper based on a lecture he gave in California describing his assessment of the two standards (Wu, 1998). He does this from both his mathematical and educational perspective. Since he is known for his critiquing of the current reform, his thinking is worthy of examination. He regards the SC's standards as a thoughtful document, into which a lot of care was used in setting forth its goals (p. 2). But overall, Wu focuses on the importance of "getting the mathematics right" in his article. He felt there are many errors that need to be corrected (for details see pp. 3-10), topics are omitted, and there is an ambiguous mixture of pedagogical statements with content statements. For example, he cites the exclusion of the division algorithm in the elementary grades and the Fundamental Theorem of Algebra in the higher grades.

Wu strongly objected to a grade 4 Geometry Standard which reads: "Students understand and use the relationship between the concepts of perimeter and area, and relate these to their respective formulas" mentioning that the trouble "is that there is no relationship whatever between perimeter and area, or between volume and surface area, unless it be the isoperimetric inequality. However, the latter would be quite inappropriate for students at this level" (p. 4). About his perceived errors, Wu has strong language: "I very much regret to say that this kind of mathematics standards would guarantee the deterioration of mathematics education for a very long time" (p. 4). While this standard may constitute an error in the eyes of one research mathematician, a fourth grade teacher explained to us how she interprets it: "We want students to understand at their level that perimeter 'goes around' and area 'covers,' and then to be able to explain (for example) in the case of a rectangle why 2xl + 2xw can be understood as measuring the 'going around' while l x w counts covering (say by square tiles)". We think a teacher can learn more about this from the Clarification and Examples in the SC's Standards that were eliminated by the SBE. So, we find in the standards debate a serious breakdown of communication between elements of the mathematics community that values precise abstract constructions upon which they conduct their work, and members of the K - 12 educational community who have learned to interpret the informal presentations of ideas that children use as they encounter mathematical concepts. Finally, we note that Wu supports the position in the SBE's standards that calculators should not be used in state-wide testing for grades K - 6.

What is yet to come

In California, the governor's staff has announced that $250 million ($60 per student) will be spent in the next year on new math textbooks (Morain, Los Angeles Times, May 13, 1998). The legislature is revising the process by which curricular materials are adopted (proposed AB 2517), so that the new criteria to be written by the SBE this summer will take effect in 90 days. This means that schools may be limited to using materials that follow the "three-phase" approach outlined as "best" in the Executive - Summary of the Carnine Report: (1) Direct instruction in skills ("other regulation"), (2) followed by a "help phase", concluding with (3) "self regulated" drill and practice. In recent (public) discussions with the CC, SBE members have stated that the "terrible" manipulative-based elementary math programs must be stopped immediately. Exactly how all this will play out depends upon fast-track legislation that will be considered during the coming months.

Nationally, a Standards forum was held on the program of the Baltimore AMS-MAA mathematics meetings in January, 1998. The panel was comprised of representatives of six ARGs. [An ARG is an "Association Review Group" from which NCTM requested assistance and input in revising its Standards - e.g., the Mathematical Association of America (see for example, Reports 1,2, and 3 of the MAA Task Force on the NCTM Standards at http://www.maa.org/); the American Mathematical Society; the Association of Symbolic Logic, etc.]. Many mathematicians shared their views on the NCTM Standards. In particular, NCTM was credited for tackling important issues in mathematics education, for addressing the needs of all students in mathematics and for drawing people inside and outside mathematics to discuss the issues. (Ross, 1998) At the same time, various concerns were expressed; for example, that the Standards need to be made less vague and less subject to misinterpretations, since a multitude of things are being done in the name of the Standards. Also, it needs to be made clear that mathematics is not always fun, not always easy, and that it is a myth that only some people can do mathematics (Ross, 1998, p. 4). Other commentators expressed views consonant with Wu's views; for example, that the Standards need to be made shorter and crisper and more specific, and that more attention needs to be paid to logic and reasoning in mathematics. The over-arching theme of problem solving was supported in the discussions. But the ARGS only provide suggestions for the NCTM to consider. The NCTM revision of its Standards (called Standards 2000) is scheduled for completion in 2000.

As U.S. mathematics educators deal with the "backlash," there are other important issues that are being raised. Among them, the manner in which precise mathematical language and logical arguments (from informal reasoning to proof) are developed - in particular, what are our expectations across grade spans and how do educators help students develop these understandings - and communicating how "real-world" problems can help enhance mathematical understanding and eliminating a possible - over-emphasis on them where the distractions of the context obscure the mathematics. Beyond the curricular issues, there still remain those of teacher preparation. There is insufficient support for continuing teacher education and there is a great need to revamp preservice teacher preparation programs. Using the new curricula requires greater teacher understanding of both the mathematics and the approaches different students will take in learning. Finally, there are those who feel a need to further exa-

mine under what circumstances cooperative learning is effective and when it may not be, and more generally, the issue of how constructivist thinking is influencing, or should influence, approaches to teaching (cf., Kilpatrick, 1997).

U.S. Secretary of Education Richard W. Riley has concerns about the deep divisiveness of the debate over mathematics education reform. In a major talk at the Baltimore AMS-MAA meeting, he mentioned in a forceful manner that "This leads me back to the need to bring an end to the shortsighted, politicized and harmful bickering over the teaching and learning of mathematics. I will tell you that if we continue down this road of infighting, we will only negate the gains we have already made - and the real losers will be the students of America" (Riley, 1998). Referring to the California "math wars" he continues, "Let me say right now that this is a very disturbing trend, and it is very wrong for anyone addressing education to be attacking another in ways that are neither constructive nor productive. It is perfectly appropriate to disagree on teaching methodologies and curriculum content. But what we need is a civil and constructive discourse". Perhaps we can see that the California "math wars" have, in the final analysis, served a useful purpose. Overall they have served as a lesson on how not to behave in the future, in rethinking and reconstructing school mathematics education for the benefit of our students.

Footnote [1]: State law requires 30 months between setting criteria and an adoption. The materials approved in October 1994 by the SBE were aligned with the 1992 Framework criteria, and state funding for purchase of these materials was available for the 1995-96 academic year.

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International Mathematics Project Competition Izmit, Kocaeli (Turkey), 23-28 July, 1997[1]

A report by Tibor Nemetz

Subjective introduction
This is report on a

"Mathematical Project Competition for Secondary School Children".

As a preliminary remark, I would like to mention that back in the 70's we dreamed, together with Tamas Varga, father of the new-maths wave in Hungary, that a real continuation of hands-on, discovery, etc. approaches to young (up to 10-12 years old) childrens' maths education should be based, or at least should involve, the *complete* solution of real life problems. There were single examples all over the world of such kind of attempts (e.g. in Italy by L. Grugnetti) but they never became general practice. This kind of *project* work attracted the attention of Anne Hawkins (Hawkins, 1986) who started a project competition *in statistics* in England, which is still running successfully and has been copied by others. This type of extra-curricular activity was not exercised within mathematics, however (to the best of my knowledge; if you know of some activities going on in this direction, please inform me).

I have kept advocating this idea within different forums, like the conferences on the teaching of mathematical applications and modelling, but without much success. Recently, during my two years' stay at the Middle East Technical University (METU), Ankara (Turkey), I offered (conducted) a "Project Course in Mathematics for Students Teachers" which was extremly well received by my students. This is reflected in the fact that one of them, Ilyas Karakaya, was able to convince officials to sponsor an international competition with 16 participating countries, formally organized by the Kocaeli Private Erkul Secondary School, Izmit, Kocaeli, Turkey, 23-28 Jul, 1997. I was invited to take part in the work of the jury and I very much enjoyed this work. There were plans to make a tradition out of this competition, and it would have been nice to conclude this report by announcing the date of the next one. Unfortunatelly, the organizers seem to have financial difficulties in proceeding with their plans. I am convinced that a continuation is needed and that this topic would be worth deeper considerations.

Announcing the Competition
Originally the Competition was considered for Turkey only. As the idea spread amongst former METU students, it turned out that those practising in foreign private schools also wanted an opportunity to include their students in the competition. Therefore, the Announcement was formulated as a call for an international event. It was issued by Mehmet Ertekin, Director (Chief Organizer) and Ilyas Karakaya, General Coordinator, on behalf of the Kocaeli Private Erkul College, Izmit, Kocaeli, Turkey.

The organizers invited contestants aged 13-19 years old, from any country, who were not yet registered at any university. Participating teams were expected to report on their own project work done in their own schools, with the help of their own teachers and possibly

supported by some academic advisors. Submissions had to be original and should be collective works of the students. They further had to reflect scientific work. A guide to submissions specified their required structure: Title, followed by the stating the goal of the project; then a formal introduction; methods applied in the project; conclusions and finally discussion. References and resources were also to be mentioned. The projects were to be assessed by an international jury "according to scientific existence, economic existence, actuality, practicability, preservance, conductibility, productivity, free imagination in exhibiting the project, understandability in the report, etc." Policy on partiipation costs was also announced and carried out as follows.

Costs

The organizers were generous about the participation costs. They had invited 2 representatives of all teams with full coverage of local costs. Travelling of foreign participants from Istanbul to Izmit was covered by the organizers. Awards were presented to winners in a well organized ceremony with the highest ranking officials from the province, and with coverage by several TV channels. Suffice it to announce the prizes of the winners:

First Prize (a team from Romania):	USD 1.000, their teacher USD 750,
Second Prize (a team from Iraq)	USD 750, their teacher USD 600,
Third Prize (a team from Turkey)	USD 600, their teacher USD 500.

The upper 10 percent of the participants were presented with Gold Medals, the second 20 percent with Silver Medals, and the following 30 percent with Bronze Medals. Excursions and socialt events were also provided free of charge.

Submissions

The topics of the submissions may be divided into the following main categories with their numbers in brackets:

Algebra, general (10), Analysis, general (13), Computers (6), Covering and Packings (4), Didactics (6), Discrete Mathematics (7), Geometry (12), Inter-Science (3), Mean values (6), Number Theory (12), Practice and Applications (8), Recreation (4), Non-classified (8).

The quality of the submissions varied a lot. A few (and luckily just a few) of them did not meet the formal requirements: Participants had copied or re-written published articles, or listed and solved common school exercises. The majority of the submissions, however, dealt with topics far beyond compulsory school mathematics.

Interestingly, many projects aimed at improving the level of maths instruction. These listed nice collections of illustrations, examples of cross-topics applications within maths and between different subjects. There was even an essay about the methods of proofs at school level. Several projects within pure maths were initiated by problems posed at national/international maths olympiads, showing that the contestants are regular readers of the periodical QUANT. Favorite topics were the general inequalities between different mean values, packing-and-covering themes and the Fibonacci numbers.

As it may have been guessed, predominant areas were Combinatorics, Number Theory, Geometry and Algebra. Just a few topics came from more sophisticated fields, e.g. Game Theory.

Information on the conference was (and is) available at the web site

http://www.erkul-edu.net

with general E-mail contact address

ozerkul@turnet.net.tr

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FUTURE CONFERENCES

ICOTS-5, June 1998

The Fifth International Conference on the Teaching of Statistics takes place at the Nanyang Technological University Singapore, 21-26 June, 1998, under the auspices of The International Statistical Institute (IS) and the Singapore National Academy of Science.

Updated information about the scientific programme can be obtain from

www.nie.ac.sg:8000/~wwwmath/icots.html

For matters concerning the scientifc programme, please contact the Chair of The International Programme Committee

Brian Phillips,
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Soon Teck Wong,
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or the Secretary

Chua Tin Chiu,
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ALM5, July 1998

ALM (Adults Learning Maths) is an international forum bringing together researchers and practitioners in adult mathematics/numeracy teaching and learning in order to promote the learning of mathematics by adults. The fifth ALM conference, ALM5, 1998, will be held near Utrecht, the Netherlands, 1-3 July 1998.

Information about the conference is available from:

http://www.euronet.nl/~groenest/alm5/

For further information, please contact

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Teaching in mathematics, July 1998

An International Conference of the title indicated above will take place 3-6 July 1998 in the island of Samos, Greece. The main objective of the conference is to examine new ways of teaching undergraduate mathematics. It will provide a unique and centralised forum and bring together faculty members from various countries who are committed to introducing and using innovative teaching methods. The conference will be of great interest to mathematics faculty as well as to anyone involved in the teaching and learning process of undergraduate mathematics. Conference themes include: Integration of computing technology; Innovative ways of teaching; Reform issues related to calculus and other math courses; Distance learning technologies; Assessment of student learning; The role of mathematics in other disciplines.

For further information, please contact the conference chair:

Ignatios Vakalis
Department of Math & Computer Science, Capital University
e-mail: <ivakalis@capital.edu>

or consult the World Wide Web at http://icg.harvard.edu/~samos98

PME22, July 1998

The 22nd Annual Conference of the International Group for the Psychology of Mathematics Education, PME22, will be held in Stellenbosch, South Africa, 12-17 July 1998. The theme of the conference is *Diversity and Change in Mathematics Education.*

Stellenbosch is a historic town in the heart of the Cape winelands, about 50 km from Cape Town. Affectionately known as the 'town of oaks' due to the many beautiful oak tress lining its streets, it is renowned for its beauty, serenity, architecture, culture and art.

For further information you may visit the PME22 website at

http://www.sun.ac.za/pme22

or contact

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Third International DERIVE and TI-92 Conference, July 1998

This conference will be held 14-17 July 1998, on the campus of Gettysburg College in Gettysburg, Pennsylvania, USA. Papers submitted for consideration by the Conference Committee should reach conference organiser Professor Carl Leinbach (see below) no later than 15 November 1997. For further information please contact either of the following conference organisers

Carl Leinbach,
Gettysburg College, Gettysburg, PA 17235,
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e-mail: <leinbach@gettysburg.edu>

or

Bert K. Waits,
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CIEAEM 50, August 1998

The 50th conference of *Commission internationale pour l'étude et l'amélioration de l'ensignement des mathématiques* (CIEAEM) will take place in Neuchâtel, Switzerland, 2-7 August 1998. The general theme of the conference is 'Relationships between Classroom Practice and Research in Mathematics Education', with sub-themes 'Goals of mathematics teaching', 'Communication and collaboration between practitioners and researchers', 'Research in mathematics education and teacher training', 'Specific features of research in mathematics education', 'Taking account of research results in teaching aids and teachers' guides'. The scientific activities include plenary sessions,

working groups, individual or group presentations, workshops, forum of ideas, and special sessions. The official conference languages are French and English. For further information, please contact

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ICMI-EARCOME 1, August 1998

The First ICMI East Asia Regional Conference on Mathematics Education (ICMI-EARCOME 1) will be held 17-21 August 1998 at the Korea National University of Education, Chungbuk, Republic of Korea. See announcement elsewhere in this Bulletin.

Junior Mathematics Congress, August 1998

The Institute of Mathematics, University of Potsdam, Germany, and the Brandenburg Asssociation for the Promotion of Mathematically and Scientifically Gifted Pupils jointly organise the Junior Mathematical Congress, 17-22 August 1998, for mathematically interested high school students from Europoe and from overseas, as a satellite congress of the ICM-98 (see below). Further information can be obtained at

http://www.uni-potsdam.de/u/mathe/junmc98.htm

or by contacting

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International Congress of Mathematicians, ICM-98, August 1998

This congress will be held, under the auspices of the International Mathematical Union, 18-27 August 1998 in Berlin, Germany. The Board of Directors of the

Organizing Committee consists of

President: M. Grötschel, Berlin
Vice-President: M. Aigner, Berlin
Honorary President: F. Hirzebruch, Bonn
Treasurer: J. Sprekels, Berlin
Secretary General: J. Winkler, Berlin

The International Programme Committee is chaired by Phil. J. Griffiths, Princeton, USA.

The current plans for the congress include the following sections: 1. Logic; 2. Algebra; 3. Number Theory and Arithmetic Algebraic Geometry; 4. Algebraic Geometry; 5. Differential Geometry and Global Analysis; 6. Symplectic Geometry and Hamiltonian Theory; 7. Topology; 8. Lie Groups and Lie Algebra; 9. Analysis; 10. Ordinary Differential Equations and Dynamical Systems; 11. Partial Differential Equations; 12. Mathematical Physics; 13. Probability and Statistics; 14. Combinatorics; 15. Mathematical Aspects of Computer Science; 16. Numerical Analysis and Scientific Computing; 17. Applications; 18. Control Theory and Optimization; 19. Teaching and Popularization of Mathematics; 20. History of Mathematics.

Further information about ICM-98 can be obtained through the World Wide Web, through URL:

http://elib.zib.de/icm98

First International Congress on Ethnomathematics, September 1998

The First International Congress on Ethnomathematics, ICEM-1, will be held under the auspices of the University of Granada (Spain), 2-5 September 1998. Spanish and English will be the official languages of the conference.

The general theme of the conference will be *research, curriculum development, and teacher education*. The scientific programme of the conference consists of plenary lectures, oral presentations, oral communications, posters and videos. For further information, please consult

http://www.ugr.es/local/oliveras

or contact

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UMTC 98, September 1998

The 24th annual Undergraduate Mathematics Teaching Conference, UMTC 98, will be held at Sheffield Hallam University, Sheffield, UK, 7-10 September 1998. The conference is a working conference to improve the design and delivery of the mathematics curriculum for undergraduates. For 1998 the main themes are *the impact of technology on assessment, students talking mathematics, what's a mathematics degree for,* and *modern approaches to teaching calculus - sharing good practice.* For further information, please consult

http://www.hull.ac.uk/mathskills/umtc/

or the conference chair

Peter Edwards
e-mail: pedwards@bournemouth.ac.uk

ICTMA 9, July-August 1999

The 9th International Conference on the Teaching of Mathematical Modelling and Applications, ICTMA 9, will be held in Lisbon, Portugal, 30 July - 3 August 1999. The aim of this conference is to provide a forum for the presenttion and exchange of information, experiences, opinions and ideas relating to the teaching, learning and assessment of mathematcal modelling, mathematical models and applications of mathematics. People engaged in research or practice in these topics at secondary and higher levels of education are invited to participate, present papers or conduct workshops. There will also be provision for those who would like to make a poster presentation of work in progress or of smaller scope than would warrant a full paper or workshop.

For further information, please consult

http://www.fc.ul.pt/educacao/ictma9

or the Chair of the Programme Committee,

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Third European Congress of Mathematics, July 2000

The Third European Congress of Mathematics will be held in Barcelona, Spain, 10-14 July, 2000. Further information will be released in due course.

ICME-9, July-August 2000

The Ninth International Congress on Mathematical Education, ICME-9, is going to be held 31 July - 7 August 2000, at the Chiba Convention Centre, Makuhari, at the Tokyo Bay, near Narita Airport. Further information will be available in forthcoming issues of this Bulletin.

Various news

The *African Mathematical Union Commission on the History of Mathematics in Africa* (AMUCHMA) has established a web page, by the help of Professor Scott Williams, Mathematics Department, State University of New York at Buffalo. The address is

http://www.math.buffalo.edu/mad/amu_chma_announce.html

The web page includes the 19 issues of the AMUCHMA-Newsletter published so far.

The *Commission internationale pour l'étude et l'amélioration de l'ensignement des mathématiques* (CIEAEM) elected new officers of the Commission as of July 1997. They are

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The ICMI Bulletin is also stored as an ASCII file in the editor's (i.e. the ICMI Secretary's) electronic mail system. If you want to receive a copy of this issue as an ASCII text through e-mail, please contact Mogens Niss at <mn@mmf.ruc.dk>.

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