

ICMI

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International Commission
on
Mathematical Instruction

No. 38

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The International Commission on Mathematical Instruction

ICMI

Bulletin No. 38

June 1995

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The International Commission on Mathematical Instruction

Executive Committee 1995-1998

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

A Word of Thanks to the Members of the Former Executive Committee

Miguel de Guzmán

At its first meeting held in Madrid at the end of February 1995, the new ICMI Executive Committee appointed for the period 1995-1998 decided to transmit a warm expression of thanks to the previous Executive Committee in the name of the whole mathematics community for all the its efforts towards the progress of mathematics education around the world. Its efficiency has been remarkable in many respects but we thought that there are some aspects of the work done in the past period that deserve to be explicitly mentioned.

The consolidation and integration of the efforts of all those working towards the improvement of mathematics education has been very effectively pursued through the celebration of the 7th International Congress on Mathematical Education (1992) held in Québec. The preparation of the ICME-8 in Seville will continue to influence mathematics education along the same lines.

The Executive Committee has continued, through the series of ICMI Study Conferences on, respectively, Assessment, Gender and Mathematics Education, Research in Mathematics Education, and the preparation of some others, with the policy of exploring particular issues of crucial importance in the field of mathematics education.

The former Executive Committee has tried to establish an active policy of mutual cooperation in matters concerning mathematics education with countries which might be needing help in this respect. The Solidarity Fund started at the ICME-7 in Québec has found a very favorable reception in the mathematics community.

The attention given by the former Executive Committee to the diversity of different systems and ways of viewing the problems of mathematics education around the world has been very intensive. The Executive Committee has cooperated in the organization of several regional meetings during the past four years and has tried to stimulate the establishment of national structures (ICMI subcommissions) which might serve as links with the ICMI Executive Committee in order to increase the efficiency of ICMI's work.

The Executive Committee worked enthusiastically on these and many others tasks and in great harmony with the Executive Committee of the International Mathematical Union. The approval of the work done by ICMI was very openly expressed by many members of the General Assembly of the IMU in Zürich (1994) who hoped that ICMI will play a still more important role in the future concerning the impact of mathematics on our culture.

The new Executive Committee particularly wishes to extend its sincere thanks to the outgoing members of the previous EC: Vice-President Lee Peng Yee (Singapore),

Members Yuri Ershov (Russia) and Eduardo Luna (the Dominican Republic), and Members Ex-Officio Jack van Lint (the Netherlands) and Jacques-Louis Lions (France) have all played important and instrumental roles in the international exchange of information, concerns, and ideas in relation to mathematics education. Very special thanks are due to Past President Jean-Pierre Kahane, whose energy, effort and commitment for many years have guided the work done by ICMI. In him and in the other former members, the new members of the Executive Committee have wonderful examples to follow.

Miguel de Guzmán
President of ICMI

Brief Report to the IMU on ICMI activities in 1994

1. Organisation

In 1994 the Executive Committee of ICMI met in Zürich (Switzerland) on the 4th August, in conjunction with the International Congress on Mathematicians (ICM-94). Beside in meetings, the work in the EC is conducted by correspondence and electronic communication under the direction of the President and the Secretary.

At the General Assembly of the International Mathematical Union, held in Luzern (Switzerland) in July-August 1994, a new Executive Committee was appointed for the term 1 January 1995 - 31 December 1998.

ICMI now has 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) which obtained its affiliation as of 1 April 1994.

2. ICMEs

The planning of *ICME-8*, to be held in Sevilla (Spain) in July 1996, is in progress. The International Programme Committee - chaired by Professor Claudi Alsina, Barcelona - met in Sevilla, 16-17 September 1994, to finally determine the structure of the congress programme and to appoint main speakers, group leaders and panel members. By the end of 1994 the editing of the first announcement was completed.

The EC has received three formal declarations of intent to host *ICME-9* in the year 2000. The countries offering to host the congress are Argentine, Brazil and Japan. Each country has been invited to prepare an information dossier to substantiate its bid. The new EC of ICMI will deal with the applications in its first meeting, to be held in Madrid (Spain), February 1995.

3. ICMI Studies

The mounting and conducting of so-called ICMI studies on crucial themes and issues in mathematics education was continued in 1994.

The written outcomes of the ICMI study on *Gender and Mathematics Education*, the study conference of which was held in Höör (Sweden), 7-12 October 1993, are conference proceedings and a volume in the ICMI Study Series. The latter will be published by Kluwer Academic Publishers. Both publications, which are being edited by the chair of the International Programme Committee, Professor Gila Hanna, OISE, University of Toronto (Canada), are expected to appear in 1995.

The study conference on *What is Research in Mathematics Education, and What Are Its Results?* was held at the University of Maryland, near Washington DC, 8-11 May

1994 with 81 participants from 23 different countries. As part of the conference programme a one-day symposium 'Perspectives on Mathematics Education Research' was held at the U.S. National Academy of Sciences, 10 May. This symposium attracted an additional 18 US attendees. The study conference - which was organised by an International Programme Committee, chaired jointly by Professors Jeremy Kilpatrick, University of Georgia, Athens (USA), and Anna Sierpinska, Concordia University, Montréal (Canada), and by Professor James T. Fey, University of Maryland, as the Local Organiser - was based on a Discussion Document published officially in *l'Enseignement mathématique* 39, fasc. 1-2, janvier-juin 1993, pp 179-86, and in the ICMI Bulletin, No. 33, December 1992. A resulting volume to be published in the ICMI Study Series is being edited by Jeremy Kilpatrick and Anna Sierpinska.

The next ICMI Study in the series will be *Perspectives on the teaching of geometry for the 21st century*. An International Programme Committee was appointed in 1994. It is chaired by Professor Vinicio Villani, Pisa (Italy). The study conference will be held at the University of Catania, Sicily (Italy) 28 September - 2 October 1995. The Local Organising Committee is chaired by Professor Carmelo Mammana, Catania. The Discussion Document for this study was published officially in *l'Enseignement mathématique* 40, fasc. 3-4, juillet-décembre 1994, pp 345-357, and in the ICMI Bulletin, No. 37, December 1994, pp 6-16.

Plans for a further study on the *rôle of the history of mathematics in mathematics education* are being developed as well. The same is true for a number of other ideas for future studies.

4. Regional Conferences

Financial support was given by ICMI to The ICMI-China Regional Conference in Mathematics Education, held at East China Normal University, Shanghai (China), 16-20 August 1994. The theme of the conference was Teacher Preparation in Mathematics.

The Executive Committee has further decided to sponsor *Regional Collaboration in Mathematics Education: An ICMI Regional Conference* to be held at Monash University, Melbourne (Australia), 19-23 April 1995. As this conference takes place in a developed country ICMI's sponsorship does not involve financial support.

5. ICMI Lectures at ICM-94

As in the past ICMI organised a number of lectures at the International Congress of Mathematicians (ICM-94), Zürich (Switzerland), 3-11 August, 1994. The following lectures were given: Christian Mauduit (Université de Aix-Marseilles II, France): *Challenging mathematical activities for young people*, 6th August; Jeremy Kilpatrick (University of Georgia, Athens, USA) & Anna Sierpinska (Concordia University, Montréal, Canada): *What is research in mathematics education? - Preliminary outcomes of an ICMI study*, 9th August; Henry Pollak (Columbia University, New York, USA): *The rôle of applications in mathematics education*, 9 August; David Tall (University of Warwick, UK): *Understanding processes of advanced mathematical thinking*, 10 August. A fifth lecture, to be given by Roger Penrose, was in the programme but was unfortunately cancelled by the speaker.

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.

A 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. For the time being the Fund will be in charge of a committee chaired by Professor Jean-Pierre Kahane, Past-President of ICMI and with administrative assistance from the ICMI Secretariat. In 1994 a major addition to the Fund was that the net profit (almost US\$ 16.000) of ICME-7, held in Québec (Canada), August 1992, was transferred to the Solidarity Fund. The ICMI EC is most grateful to the ICME-7 organisers for this generous support of the Solidarity Programme.

In 1994 the Fund was activated to support (a) a project (begun in February 1994) in El Salvador to help establishing master programmes in statistics and in mathematics education, (b) the attendance of an IPC member and plenary speaker at the ICMI-China Regional Conference in Mathematics Education, Shanghai (China), August 1994. By the end of 1994 the Solidarity Fund contained a total of about US\$ 31.300.

7. ICMI Bulletins

In 1994 ICMI Bulletins No. 36 (June) and 37 (December) were published under the editorship of the Secretary of ICMI. By the end of 1994 the Secretary has applied for an ISSN-number for the Bulletin. It is expected that such a number will be in place as from issue 38, June 1995.

Mogens Niss, Secretary

Roskilde University, Roskilde, Denmark

1 February 1995

ICMI Accounts 1994:

1 January - 31 December

Swiss Franc Account:

Income:

balance 1993	89.429,84
IMU (Schedule A: Administration)	10.000,00
IMU (Schedule B: Scientific Activities)	18.000,00
interest	1.476,73
total	<u>118.906,57</u>

Expenditure:

transfer charges (IMU)	13,04
transfer to to Danish Kroner Account	10.000,00
Grant to the Moscow Olympiad	752,76
President's expenses (Research Study & ICM-94) ¹⁾	2.468,20
Secretary's expenses ICM-94	656,54
ICMI balance 1994	105.016,03
total	<u>118.906,57</u>

Danish Kroner Account:

Income:

ICMI balance ²⁾ 1993	-1.237,54
Solidarity Fund balance ²⁾ 1993	916,16
contribution to ICMI's Solidarity Fund ³⁾	3.403,34
transfer from Swiss Francs Account (10.000)	46.470,00
transfer from Sterling Account (3.000)	28.691,10
total	<u>78.243,06</u>

Expenditure:

EC meeting and members' participation in ICMI study conference on gender, in Höör (Sweden) ⁹⁾	13.482,00
ICMI study on geometry, IPC meeting in Catania (Italy)	6.896,74
ICMI study on research, University of Maryland, USA ¹⁾	16.088,70
EC meeting and geometry study IPC meeting at ICM-94,	12.548,06
Secretary's participation in Regional Conference, Shanghai ⁵⁾	13.750,01
typing of Bulletin 36 & 37	1.400,00
credit card charge	150,00
Grant from the Solidarity Fund ⁶⁾	7.701,90
Solidarity Fund balance 1994	-3.382,40
ICMI Balance 1994	9.608,05
(account balance)	6.225,65)
total	<u>78.243,06</u>

Sterling Account:**Income:**

balance 1993	24.567,72
CUP royalties for studies	87,34
interest	583,73
total	<u>25.238,79</u>

Expenditure:

ICMI study on research, University of Maryland, USA ¹⁾	368,62
ICMI lecturer at ICM-94	448,57
transfer to Danish Kroner Account	3.000,00
transfer charges	13,64
ICMI balance 1994	21.407,96
total	<u>25.238,79</u>

US\$ Account:

Income:

ICMI balance ²⁾ 1993	6.985,66
Solidarity Fund balance ²⁾ 1993	20.829,58
interest	505,14
net profit from ICME-7, granted to the Soidarity Fund	15.937,20
private contributions to ICMI's Solidarity Fund	92,44
total	<u>44.350,02</u>

Expenditure:

ICMI contribution to Regional Conference in Shanghai ⁵⁾	2.000,00
Secretary's conference fee, Shanghai	250,00
deposit regarding the ICMI study on research, University of Maryland, USA ¹⁾	1.000,00
ICMI study on geometry, IPC meeting, Catania (Italy)	525,43
ICMI grant to ICME-8, Sevilla (Spain), July 1996	5.000,00
ICMI loan to ICME-8, Sevilla (Spain), July 1996	10.000,00
transfer charges	49,33
Solidarity Fund contribution to El Salvador project	5.000,00
Solidarity Fund balance 1994	31.859,22
ICMI balance 1994	-11.333,96
(account balance	20.525,26)
total	<u>44.350,02</u>

Notes:

1. Most of ICMI's expenditures in 1994 concerning the ICMI Study Conference on *What is Research in Mathematics Education, and What Are Its Effects*, held at the University of Maryland (USA), 8 - 11 May 1994, will be reimbursed by the conference budget in 1995.

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** is 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 1994 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.

3. This contribution comes from the Dutch Association of Mathematics Teachers (*Nederlandse Vereniging van Wiskunde Leraren*).

4. In 1993 the preparation and holding of the ICMI study conference on *Gender and Mathematics Education* took place in Höör Sweden. An EC meeting was held in connection with the study conference. Only some of the costs were paid in 1993. The remaining costs (EC members' conference fees) were paid in 1994.

5. The *ICMI-China Regional Conference on Mathematics Education* took place in Shanghai (China), 16-20 August 1994.

6. Grant given to support the participation of an IPC member and plenary speaker in the Regional Conference in Shanghai.

7. In addition to the amounts displayed directly in the accounts, considerable extra sums should appear but do not and cannot. In 1994 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 so forth.

Mogens Niss
31 January 1995

ICME-8, Sevilla, Spain, 14-21 July 1996, **1st Announcement**

The Spanish National Committee for the ICME-8, on behalf of the International Commission on Mathematical Instruction and the Federación Española de Sociedades de Profesores de Matemáticas, is pleased to announce that the Eighth International Congress on Mathematical Education will be held in the city of Sevilla (Spain) from 14 to 21 July 1996. Previous ICMEs were held in Lyon (France), Exeter (UK), Karlsruhe (Germany), Berkeley (USA), Adelaide (Australia), Budapest (Hungary), and Québec (Canada), under the auspices of ICMI, a Commission of the International Mathematical Union (IMU). The ICME-8 intends to continue this series of congresses with the objective of increasing the development of mathematical education in order to improve the learning and teaching of mathematics. We invite you to participate in ICME-8, the programme of which will include a wide variety of scientific activities and an extensive cultural and social programme for delegates and their companions, where you will have an opportunity to exchange views and discuss new ideas about the basics of mathematics education, in an international setting.

In order to achieve a greater participation of mathematics educators from developing countries, and in the spirit of the ICMI Solidarity Fund, the ICME-8 Organisation will divert some of its income towards grants. More detailed information about this point will be provided in the second announcement.

The ICME-8 includes a rich scientific programme which will cover the most important areas in mathematical education and will confront the crucial problems which will be of interest to the 3.500-4.000 delegates we expect to welcome to this Congress.

Principal activities include plenary and ordinary Lectures, Working Groups, Topic Groups, Round Tables, Workshops, National Presentations, Short Presentations, Projects, Films and Special Exhibitions. There will also be Exhibitions of books, software, and various teaching materials. The Study Groups affiliated to the ICMI, and organisers of recent ICMI studies, will contribute to the programme, presenting reports on their activities. Special meetings will also be arranged (ICMI General Assembly, Associations, Magazines, etc.). Each participant will receive a copy of the Official Proceedings.

English and Spanish will be the official languages. French and Portuguese, being the languages of the neighbouring countries, may be spoken and translated informally in the Working Groups, Topic Groups and Study Groups. However, it is anticipated that most sessions will be conducted in English. Some information, services and translation will be available in other languages.

For proposals concerning the scientific programme, please write to the Chair of the International Programme Committee at the Congress address.

From the 1st of March 1995, you will be able to consult Mosaic for ample information on all aspects of ICME-8 (programme, committees, infrastructure, congress venue,

services etc.). This information will be updated periodically.

The URL is: <http://icme8.us.es/ICME8.html>

For information concerning the Local Organisation, please contact

The Organising Committee

SAEM Thales

Facultad de Matemáticas

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Fax: +34 5 4423 6378

e-mail: <icme8@obelix.cica.es>

If you want to receive the 2nd Announcement, please send your coordinates with an initial indication of the Working Group and the Topic Group in which you would prefer to participate to:

ICME-8

Apartado de Correos 4172

41080 Sevilla,

SPAIN

fax: +34 5 421 8334.

Below you will find a list of the Working Groups (WGs) and the Topic Groups (TGs) together with the names of the Chief Organisers (COs) to the extent they are confirmed by 1 June 1995:

Working Groups:

WG1: Communication in the classroom

CO: To be confirmed

WG2: Forms of mathematical knowledge

CO: Dina Tirosh (Israel)

WG3: Students' attitudes and motivation

CO: To be confirmed

WG4: Students' difficulties in learning mathematics

CO: Luciano Meira (Brazil)

WG5: Teaching mixed-ability classes

CO: Liora Linchevski (Israel)

WG6: Gender and mathematics

CO: Barbro Grevholm (Sweden)

WG7: Mathematics for gifted students

CO: To be confirmed

WG8: Mathematics for students with special needs

CO: Jens Holger Lorenz (Germany)

WG9: Innovation in assessment

CO: Antoine Bodin (France)

WG10: Languages and mathematics

CO: Manolo Fernandez Reyes (Spain)

WG11: A curriculum from scratch (zero-based)

CO: Anthony Ralston (USA)

WG12: Curriculum changes in the primary school

CO: Mary Lindquist (USA)

WG13: Curriculum changes in the secondary school

CO: Martin Kindt (Netherlands)

WG14: Linking mathematics with other school subjects

CO: To be confirmed

WG15: The impact of technology on the mathematics curriculum

CO: Michal Yerushalmy (Israel)

WG16: The role of technology in the mathematics classroom

CO: Marcello Borba (Brazil)

WG17: Mathematics as a service subject at the tertiary level

CO: Eric Muller (Canada)

WG18: Adults returning to mathematics education

CO: To be confirmed

WG19: Preparation and enhancement of teachers

CO: Marjorie Carss (Australia)

WG20: Evaluation of teaching, centers, and systems

CO: David Robitaille (Canada)

WG21: The teaching of mathematics in different cultures

CO: Jerry Becker (USA)

WG22: Mathematics, education, society, and culture

CO: Richard Noss (UK)

WG23: Cooperation among countries and regions in mathematics education

CO: Bienvenido Nebres (Philippines)

WG24: Criteria for quality and relevance in mathematics education research

CO: Kenneth Ruthven (UK)

WG25: Didactics of mathematics as a scientific discipline

CO: Nicollina Malara (Italy)

WG26: Connections between research and practice in mathematics education

CO: Beatriz D'Amrosio (USA)

Topic Groups

TG1: Primary school mathematics

CO: Régine Douady (France)

TG2: Secondary school mathematics

CO: Glenda Lappan (USA)

TG3: University mathematics

CO: Joel Hillel (Canada)

TG4: Distance learning of mathematics

CO: Haruo Murakami (Japan)

TG5: Education for mathematics in the working place

CO: Annie Bessot (France)

TG6: Mathematics teaching from a constructivist point of view

CO: Ole Björkqvist (Finland)

TG7: The fostering of mathematical creativity

CO: Erkki Pehkonen (Finland)

TG8: Proofs and proving : Why, when and how

CO: Michael de Villiers (South Africa)

TG9: Statistics and probability at the secondary level

CO: Brian Phillips (Australia)

TG10: Problem solving throughout the curriculum

CO: Kaye Stacey (Australia)

TG11: The future of calculus
CO: Ricardo Cantoral (Mexico)

TG12: The future of geometry
CO: Joe Malkevitch (USA)

TG13: The future of algebra and arithmetic
CO: To be confirmed

TG14: Infinite processes throughout the curriculum
CO: Bruno D'Amore (Italy)

TG15: Art and mathematics
CO: Dietmar Guderian (Germany)

TG16: History of mathematics and the teaching of mathematics
CO: Louis Charbonneau (Canada)

TG17: Mathematical modelling and applications
CO: Joao Pedro da Ponte (Portugal)

TG18: Roles of calculators in the classroom
CO: Pedro Gomez (Colombia)

TG19: Computer-based interactive learning
CO: Nicolas Balacheff (France)

TG20: Technology for visual representation
CO: Rosamund Sutherland (UK)

TG21: Mathematics instruction based on manipulative materials
CO: Ana Garcia-Aczarate (Spain)

TG22: Mathematical games and puzzles
CO: Aviezri Fraenkel (Israel)

TG23: Future ways of publishing in mathematics education
CO: Don Albers (USA)

TG24: Mathematics competitions
CO: Patricia Fauring (Argentina)

TG25: Mathematical clubs
CO: To be confirmed

TG26: International comparative investigations
CO: Gabriele Kaiser-Messmer (Germany)

International Mathematical Olympiads - some reflections

John Hersee

Introduction

I first attended an International Mathematical Olympiad (IMO) in 1978, when 17 countries competed in the 20th IMO in Romania. I was there as Deputy Leader of the UK team, but also to study the organization of an IMO, since England intended to host the 1980 IMO. There was a quaint informality about the way an IMO host country issued its invitation. At the final prize-giving ceremony of an IMO the Team Leader of next year's host country would verbally invite participation in the next year's IMO. Of course, through informal discussions during the IMO next year's host had become known, so there was no surprise. However, during the 1978 IMO it became clear that the expected invitation for 1979 was not to be issued. There was only one thing we could do. After discussion with Robert Lyness, the Leader of the UK team, and a phone call to London, we invited the IMO for 1979, instead of 1980, in the hope that during the next 12 months another country would be able to prepare to issue an invitation for 1980.

That hope was not fulfilled. It was some time before it was generally realized that, in the early years of the IMO, when all the competing countries were in Eastern Europe, the pattern of invitations had been arranged between the governments of those countries; there was a structure behind the apparent informality. The addition of invitations from western countries (Austria had been host in 1976) had disturbed this underlying organisation. Participation by countries outside the eastern block was also on a different basis. Frequently "western" teams were not sponsored by governments (as were those from the eastern block), but by national committees, organising the selection of a team and often raising funds from private sponsors. Also, as the size of the IMO began to grow, more careful planning and organization over several years became necessary, and the cost to the host country increased. In 1979 in London 23 countries competed; in Turkey in 1993 there were 73 teams.

No country issued an invitation for 1980; there was no IMO in that year. The USA invited the IMO for 1981 and, as we prepared for that IMO, we learned that Finland had asked ICMI to set up an "IMO Site Committee" (IMOSC) to ensure that, in future, there would be an IMO each year. [I became Secretary of the IMOSC and held that post until 1994.]

Initially the IMOSC was viewed with some suspicion by many Team Leaders, who questioned the need for such a committee and feared that it would interfere in the running of IMOs. But the brief history I have presented shows that an IMOSC is now essential: to ensure that there is an IMO each year; to enable host countries to plan and prepare and to raise the necessary funding. Less obviously, other IMO matters require the existence of some continuing organization.

What happens at an IMO?

An outline of IMO administration and current practice will help readers who have not taken part in an olympiad. At the end of each IMO an informal, verbal invitation is given by the Leader of the next year's host country. Official invitations to the governments of invited countries are usually sent in December; the IMO takes place in the following July. It is accepted custom to invite all countries that have participated in previous IMOs; in addition, some "new" countries are invited. Normally the invitation is for an adult Leader and Deputy Leader, and a team of up to six school pupils.

Countries that accept the invitation to participate are invited to submit to the Organizing Committee of the host country some possible problems (with solutions!) for the competition. Participating countries are responsible for the cost of travel for their team and its Leaders to the host country, but the host country meets all costs of travel, accommodation, food, excursions and entertainment for team members, Leaders and Deputies during the period of the IMO.

The IMO last about 7 days, but the Team Leaders arrive a few days in advance of the teams and Deputies, and form the International Jury. The Jury is responsible for the academic side of the IMO. From the problems submitted by participating countries the host country will have made a selection for consideration by the Jury during the days before the teams arrive. The problems selected are considered by the Jury and six are selected for the competition. The chosen six problems are carefully examined by the Jury and their wording checked. They are divided into two sets of three for the two problem papers, and translations into the competitors' languages are prepared. The translations are carefully checked to ensure fairness.

The two problem papers are written by the competitors on two consecutive days. Each problem is worth 7 points and 4½ hours are allowed for each day's paper. Each competitor receives the problems and writes answers in his or her own language. Once the papers have been written the competitors enjoy a social programme of visits, sports, etc. Throughout their time in the host country each team has a guide, provided by the host country, who can speak the team's language.

Until both papers have been written the teams and Deputy Leaders are carefully segregated from the Leaders so that the confidentiality of the problems is preserved. (Modern communications developments may make this confidentiality more difficult to ensure!). Each competitor's scripts are marked first by the Leader and Deputy of his or her team. For each of the six problems the host country provides teams of mathematicians, known as coordinators. The coordinators examine the competitors' scripts in consultation with the appropriate Team Leader and Deputy and the points to be awarded are agreed. Thus the coordinators are responsible for ensuring consistency of standards for all teams. (If the coordinators and Leader cannot agree on the points for a particular problem the matter is brought to the Jury for resolution.)

When the marking and coordination are complete the Jury meets again to confirm the competitors' scores and to decide on the points ranges for medals. Gold, silver and bronze medals are awarded; it is the custom that about half the competitors receive a medal. In addition, a certificate of "Honourable Mention" is awarded to a

competitor who has solved at least one problem completely, but has not earned a medal. Strictly the IMO is an individual competition, but there is always great interest in the team order. The IMO ends with a prize-giving ceremony, followed by a final banquet for all who have taken part, either as competitors or in any other way.

Some concerns

The increasing size of IMOs, in terms of the number of teams competing, raises a number of problems. Recognizing the need to address these problems, the Jury has begun to ask the IMOSC for suggestions and advice. In recognition of the widening of its role (beyond simply ensuring that there is an IMO each year) the Jury has recently renamed the IMOSC as the IMO Advisory Board (IMOAB). The IMOAB is now the committee where problems are first discussed, leading to recommendations which are presented to the Jury for consideration. The IMOAB retains the same pattern as the IMOSC. A Chair and Secretary and three other members are appointed by ICMI, on the recommendation of the Jury. In addition, the IMOAB has as members representatives of three host countries; the last, the present and the next IMOs.

The range of mathematics tested in the six problems of the IMOs has remained much the same during the 35 years since 1959, the year of the first IMO. Some attempts have been made to extend the range of topics tested, but with little success. There is great variation in the school mathematics programmes of participating countries, and between their content and "IMO mathematics". This means that some competitors are at a disadvantage in the IMO, but it is not easy to find a way to ameliorate this problem. Alternative papers, based on different topics, have been suggested, but do not seem feasible. There is also concern at the number of competitors who score very few points out of the maximum of 42; some way of avoiding such a potentially discouraging experience for these competitors should be sought.

The work of the Jury in selecting the six problems also needs review. A Jury of about 20 or 30 people can work effectively; with more than 70 members, and a wide variety of languages, it becomes very difficult for all, or even most of them, to take an active part in the discussions. Many Leaders now speak English, and it has become the custom for most of the work of the Jury to be conducted in English (with translations into other languages at crucial points). But for the majority English is not their first language. Thus the subtleties of meaning in the wording of a problem may not be noticed by some Leaders, often resulting in complicated rewordings when the chosen problems are being translated into the competitors' languages. It has become clear that a different approach to the selection process may be necessary. Selection of the six problems by the host country, or by a sub-committee of the Jury, have both been suggested, but neither is liked nor, perhaps, feasible. The danger of unintentional bias in the selection; the likelihood that any sub-committee would tend to be drawn from the same countries year after year; the risk that one (or more) of the six chosen problems might have been used by a country in its training programme, are all possibilities that indicate the difficulties that could arise if the whole Jury is not involved in the selection process. An improvement might result if the Leaders were given short-listed problems, and required to work at them for about a day *without* the

solutions! Better judgement of the difficulty of each problem should result, and a clearer idea of any ambiguities in wording.

With increasing numbers of countries taking part, host countries have problems with the number of languages involved. It is becoming difficult to find enough coordinators who can understand all the languages; finding guides who speak each team's language is even more difficult. In turn, this raises the question "What is the role of the Deputy Leader?" Some countries may feel that he or she should remain with the team to help with any language or pastoral matters, but Deputies' help is often needed in the marking and coordination of the scripts. Furthermore, few Deputies would find attendance at an IMO enjoyable and rewarding if they were cut off from the academic side of the competition.

The increasing size of the IMO has obvious financial implications for host countries. One possibility might be to charge participating countries an "entry fee". However, this might be counterproductive. Admittedly, hosting an IMO is expensive, but it is probably easier for many countries to raise a large sum of money to act as host than to raise an entry fee for each year. Against this it must be accepted that the financial burden of the IMO falls unevenly on different countries. The total cost of hosting an IMO, the difficulty of finding suitable accommodation for participants, the problem of finding suitable premises for the competitors to write their solutions to the problems, all lead to the conclusion that many countries cannot be expected to act as host. It may be possible in some regions for a group of countries to act as joint host, but this would require careful negotiation of the division of responsibilities. At present, with potential host countries bidding for IMOs up to 10 years ahead, it is tempting to take no action, but if a change in the financing of IMOs is necessary it will require long term planning, looking several years ahead.

Since the growing size of IMOs raises so many problems, it has been suggested that smaller teams should be invited. Teams of four competitors were tried in the 23rd IMO, but was very unpopular. It is felt that four is too few; it makes the chances of being selected appear very small, and few countries are sufficiently confident that their selection procedures are sufficiently reliable to identify correctly their best four. An alternative proposal is to hold regional competitions as "elimination" rounds, so that only the best competitors in the regional competitions would go forward to the IMO itself. But there are serious objections.

A pattern using regional elimination competitions would probably favour those countries which have good training schemes for their teams; it is likely that some countries would never get a competitor so far as the IMO itself. Who would be the Leader of the "team" selected at a regional competition and how would this Leader's travel to the IMO be financed? There would be language problems, and young competitors' nervousness might be increased without the support of an adult from their own country. Would countries be prepared to host regional competitions? Who would finance them? For some countries hosting a regional competition might well become an annual event, since regions would remain the same from year to year. Hosting regional competitions would absorb funds in the host countries which could then hardly be expected to host an IMO from time to time. In other countries, raising

funds to compete in a regional competition, which would be seen as less prestigious than an IMO, might become more difficult. Most of all, the use of regional elimination competitions would undermine one of the main aims of the IMO, namely to provide the opportunity for talented, young mathematicians from many countries to meet and work together with their peers at the subject they enjoy. Those who compete in IMOs frequently become leading scientists and mathematicians in their countries; through participation in an IMO they often make contact with their future colleagues in other countries.

The IMOAB

The increasing size of the IMO has made the need for an IMOAB obvious. The IMO is now such a large and expensive enterprise that it cannot continue in the informal manner of the early years. While the Jury remains the "governing body" of the IMO, the fact must be faced that, *between* IMOs there is *no* Jury! Some continuing body to deal with IMO matters during the months between IMOs is essential. Invitations from future host countries must be handled formally and precisely. It is necessary for host countries to be known several years in advance, so that they can plan the IMO and raise the necessary finance; so that other countries can foresee future travel expenses; so that the IMOAB can seek hosts for "empty" years. Incidentally, the timetable for future years, with hosts bidding for years up to 10 years ahead raises other points. Countries are now bidding for years so far ahead that they may have a change of government before their IMO! If a country "drops out", it will be very difficult for another country to step into the breach as France did in 1983.

Two suggestions

Not the least of the problems faced by host countries is the unpredictability of the number of countries that will wish to take part. Bidding for an IMO some years ahead, a country must expect an increase in size, but to budget for IMO it must estimate the scale of the increase. In the event, by chance (or by external events, such as the break up of the Soviet Union), the increase in numbers may be larger than predicted. Finding a source of finance to fund IMOs in total would be very difficult, but would it be possible to find an international company, or trust, (or ICMI) that would "underwrite" the IMO in the following way?

When the IMOAB, on behalf of the Jury, accepts an invitation from a country to host a future IMO, it would agree with that country the number of countries to be expected. Looking at past figures it should be possible to make a reliable estimate, and the country wishing to host would agree to plan for and accept the estimated number of countries. The underwriting body would be involved in this decision, and would agree to meet the host country's costs for any countries in excess of the agreed estimated number. Such an arrangement would remove a major worry for host countries, while the underwriting body would be committed to a comparatively small payment.

Finally, I return to a major aim of the IMO - to provide opportunities for young mathematicians to meet, talk and work with their peers from other countries. I hope that Leaders, Deputies and host countries will make every effort to encourage

competitors to do that - to mix with and work with their rivals! I hope that host countries will look for ways of organising IMOs which will encourage these social interchanges. I remember the excellent team competition that was organised during the Prague IMO in 1984, while the IMO scripts were being marked and coordinated, where each competing team was made up of competitors from different countries. This led to a thoroughly enjoyable event, clearly carrying forward the aims and spirit of the IMO.

John Hersee,
Bristol, UK

Societies for Research in Mathematics Education

In recent years societies, associations and other fora devoted to research in and on mathematics education have been established in quite a few countries around the world. As this is one amongst several reflections of the growth of mathematics education as an academic field, the ICMI Bulletin is interested in obtaining and publishing an international survey of such societies whether new, not so new, or old. We should therefore be grateful if readers who are associated with, or simply possess information about, a national (or regional) society for research in mathematics education would inform the editor of this Bulletin about that society. Should anyone holding an office in such a society want to write an article for the Bulletin describing the society and its activities, the editor should be more than happy to publish it in a forthcoming issue.

Mogens Niss

Obituary: Stieg Mellin-Olsen, 1939-1995

Marit Johnsen Høines

The tidings of Stieg Mellin-Olsen's death reached far, Stieg will be missed by many. He was the close husband, father, grandfather and friend. He was the teacher and professor, the tutor, the researcher and the author. Everyday life was always present in his theories - and his theories were always related to everyday life.

This year in March some of us met with 40 teachers at a course. We started the day by asking the teachers what they expected the course to teach them. One of them responded this way: "I completely lost interest in mathematics when I was 10 years old, it seemed meaningless to me. I've never felt comfortable with mathematics since then. But I remember that a couple of years later a group of pupils got a new teacher, his name was Stieg Mellin-Olsen. I don't know what he did, but it must have been something special. His pupils suddenly found mathematics interesting, they understood - what they did was meaningful. I would like to learn something about what he did to those kids. I don't want my pupils to lose interest in mathematics the way I did."

We were able to provide some explanation: Stieg took the pupils seriously. He made them believe in their own abilities. He made them dare to use their own understanding. Still, questions are unanswered: How did he do it? 'Teachers have to be supported in their search for own solutions', was of Stiegs answers.

Stieg Mellin-Olsen was born 30 April 1939. He started as a mathematics teacher at secondary school after having finished his master's degree in mathematics at the university in 1965. He was engaged in work with children from working class backgrounds. His social and political commitments were a cornerstone in all his work. He took the side of the less privileged. He believed in the people's power to influence and change the oppression under which different groups are suffering. His books tell us how he addressed this task from different angles during these early years. He wrote about mathematics and mathematics education (1), he wrote novels for youth (2), and, in cooperation with Rolf Rasmussen, a book about the way school oppresses pupils and parents (3)¹.

"Dare to use your understanding!" was a headline throughout Stieg's work. The meaning of this was made apparent in all his work on different projects. In 1970 he began to work with the mathematical education of teachers. It was something very special to meet a mathematics teacher with his perspective. Most of us were used to teachers telling us how to do things, and we were supposed to learn how to do mathematics "the correct way". Stieg developed the problems through a dialogue with his students. Then he withdrew, so the students had to use their own understanding themselves, try for themselves and start to believe in themselves. They had to learn to be strong - to dare - when it came to mathematics and pedagogy. Stieg saw his students' frustrations, saw they were necessary. The students never had an indifferent (non-committed) attitude to Stieg's courses. He was interested in the whole student as a person, he knew who was a practically or a theoretically inclined individual.

Students' social identity, their experience and knowledge were to be drawn into the course as a resource. This was what they, as future teachers, ought to bring forward to their pupils. Within these frames his concept of *instrumentalism*ⁱⁱ grew. It is important to view everyday experiences from a theoretical perspective, in order to gain knowledge so as to act. His theories are having a huge impact on the education of teachers in Nordic countries.

Mellin-Olsen was professionally as well as politically a forceful, able colleague in Nordic and international professional communities. Our actions are political in so far as we manage to have an impact on society. As mathematics educators we do influence society, neutrality is impossible. It is important to gain knowledge about our political influence, and act in accordance with that knowledge. For many colleagues, Stieg's thoughts were challenging, he was an incredible pathfinder (guide) and supporter. He had an eye for people's talent and possibilities. When Gunhild Nissen (Denmark) initiated the nordic research-network "Mathematics and Democracy", Stieg was a "natural" support. In the same way he was one of the founders of the journal *Nordic Studies in Mathematics Education*. His perspectives as a qualitatively orientated researcher are shown in most of his latest work. We get some ideas from headings like: *The student remembers when he did not learn*, and *How do teachers think about their teaching of mathematics*. His concept of *task discourse*ⁱⁱⁱ was developed in this context. His theoretical, social and political engagement became evident in his work as a member of the BACOMET group. In 1987 *The Politics of Mathematical Education* was published by Kluwer Academic Publishers. It comes as no surprise that he was (in 1990) one of the initiators of the PDME (Political Dimensions of Mathematics Education) conferences London 1991, Johannesburg 1993, Bergen 1995.

Stieg was incredibly productive^{iv}, and had always a lot of projects going on: Some at the stage of initial ideas, some being underway, and some almost finished. As a professor at the University of Bergen he worked on building a PhD environment at the Institute of Practical Pedagogy. In his last days he was working on two books. One on qualitative research methods and one about female mathematics educators. His very last days of work were spent on the PDME-Conference, which will take place in Bergen in July 95. He was also busy organizing a programme for South African PhD studies at Western Cape University. He believed in the possibilities and the importance of people building their own competence and expertise. He came close to people in Southern Africa.

"I'd like to learn something about what he did to those kids." The answer we try to give to this teacher is reflected in Stieg's work in many different environments: Our possibilities lie in our strengths. One must help people to gain knowledge about their own potentials, to dare to use their understanding, and - we will have to find our own way.

We lost Stieg as professional, a colleague and friend 26 January 1995. We were lucky to share just a bit of his life. We learnt something about what it is all about, to be a friend, a colleague and a professional. Stieg wrote a lot. Readers will use his writings on the basis of their own understanding

May his memory give inspiration and strength!

On behalf of colleagues in Bergen,

Marit Johnsen Høines,
Bergen College of Teacher Education, Norway

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- (1) Mellin-Olsen, S. (1970): *Undervisningsprosjekter i matematikk, MUNK*
Mellin-Olsen, S. (1970): *Matematikk i ungdomskolen*, O.Norlis forlag, Oslo
- (2) Mellin-Olsen, S. (1979): *Skillelinjer* Gyldendal, Oslo, (1980): *Guttene i obsen*, Gyldendal, Oslo
(1984): *Sammys festning*, Tiden Norsk Forlag, Oslo
- (3) Mellin-Olsen, S. & Rasmussen, R (1975): *Skolens vold*, Pax forlag, Oslo

ii

This concept was central in his book *Læring som sosial prosess*(1977) and the article *Instrumentalism as an Educational Concept in Studies of Mathematics* (1981)

iii

"...a language and a practice of the teacher, within the context of the institution, in our case the school, and within the context of the tradition of the teaching of mathematics." "It is a syllabus on a journey through a row exercise" (our transl.) From Mellin-Olsen, S. (1990): *Opgavediskursen* (transl: task discourse) in Nissen, G & Bjørnebo, J: *Matematikkundervisning og demokrati*. Roskilde: IMFUFA, Roskilde Universitetscenter.

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Some of his publications in English:

- Mellin-Olsen, S. (1987) *The Politics of Mathematical Education*, Kluwer, Dordrecht.
- Mellin-Olsen, S. in cooperation with Howson, A.G. (1985): *Social Norms and Evaluation*. In Christiansen, B., Howson, A.G. and Otte, M.: *Perspectives on Mathematical Education*. D. Reidel Publ. Company, Dordrecht.
- Bishop, A.J., Mellin-Olsen, S. and van Dormolen, J.(eds) (1990): *Mathematical knowledge: Its Growth through Teaching*. Kluwer, Dordrecht.
- Mellin-Olsen, S.(1985): *Culture as a Key Theme for Mathematics Education*. Post seminar reflections. In Johnsen Høines, M. and Mellin-Olsen, S. (eds): *Mathematics and Culture. A seminar report*. Caspar, Landås, Norway.
- Mellin-Olsen, S.(1986): *The Role of Thinking Tools in Mathematics education*. In *Mathematics for Those Between 14 and 17, Is it Really Necessary?* CIEAEM, University of Southampton.
- Mellin-Olsen, S. (1988): *The Double Bind as a Didactical Trap*. Paper on BACOMET 2.
- Mellin-Olsen, S. (1993): *Dialogue as a didactical tool*, article presented at PDME", Johannesburg.

In Memoriam Shimshon A. Amitsur, 1921-1994

Anna Sfar

A gifted mathematician who remains creative and continually productive for nearly half a century is an uncommon phenomenon. A creative, internationally acclaimed researcher who is ready to devote a considerable amount of his time to education is an even greater rarity. Late Professor Shimshon Abraham Amitsur was a unique example of this unusual combination: he was an outstanding mathematician who remained active both in research and in the field of mathematics education throughout his life.

According to Paul Halmos, mathematics - perhaps the most demanding of human intellectual endeavors - requires single-minded devotion. "Most of us ordinary mortals don't have enough psychic energy to split between two passions", he says. The implication is obvious: if you want to be mathematician, you better dedicate yourself to the task entirely. At the historical junction where Shimshon Amitsur was to spend his life, this advice was rather difficult to take. Born in Jerusalem in 1921, more than a quarter of a century before the foundation of the State of Israel, he was to become a witness and an active participant of the process of building the new country. "A graduate student in mathematics doesn't - shouldn't have time to do anything except be a graduate student in mathematics", says Halmos. As a graduate student, Shimshon Amitsur did anything but that. For a long time, he was a soldier rather than a student. In 1941, after three years as a mathematics student at the Hebrew University, he decided to join the Jewish Brigade. During the following five years he focused much more on fighting the Nazi enemy than on tackling mathematical quandaries. Even so, he did not let mathematics lay fallow. While in Europe, he studied from the books he brought with him from home. He returned to be a regular student in 1946, but after only two years he became a soldier again. This time, his goal was to defend the independence of his newly founded country. He stayed with Israeli Defense Forces until 1950. By the time he left the army he was married to Sarah, his closest friend and companion till the last day of his life, and a father to a two year old daughter, the first of his three children.

The fact that his long and diverse military service did not discontinue his research was a clear proof of his exceptional mathematical ability. This ability has not always been recognized, though. At least, it was not always regarded as a gift worth fostering. Indeed, a decade and a half earlier his parents sent him to a vocational school, hoping that one day he would be able to make his living as a clerk. His mathematics teacher, an author of school textbooks and a quite exceptional figure himself, was the first to notice that the boy's mathematical skills embraced a special promise.

It did not take long until everybody could see how able a mathematician he was. In 1953, only three years after getting his Ph.D. from the Hebrew University, he was awarded the Israeli Prize - the highest honor the State can give to its citizens - for his contribution to algebra. Together with his teacher, Professor Levitsky, he proved an important theorem on identities in rings of matrices, known today as the Amitsur-

Levitsky Theorem. It did not take long before Shimshon Amitsur became internationally recognized as one of the most accomplished and productive algebraist in the world. The flow of his writing never stopped. His publications included works on rings with identities, simple central algebras, and rings with division. His name has been commemorated in the mathematical term "Amitsur cohomologies", denoting one of his many inventions. In recognition of his achievements he was offered an honorary membership of the London Mathematics Society and was invited to the prestigious Institutes of Advanced Study at the Universities of Princeton, Chicago, and Yale. He was an editor and a board member of several mathematical journals. Last but not least, he was a university teacher who for several decades shared his knowledge and enthusiasm with aspiring young mathematicians, as well as with thousands of other young people who came to the university with a more modest goal of becoming mathematics teachers. I was one of his many students.

The impressively diverse and intensive activity as a creative mathematician, an editor, and a teacher did not prevent Shimshon Amitsur from giving lavishly from his efforts and time to what evidently was his other great passion: the issues of education. This is where our ways crossed for the second time. As a graduate student, I joined a team that worked on a new mathematics curriculum for Israeli high schools. Professor Amitsur led the project, together with Professor Michael Mashler who for a few years agreed to participate in the enterprise, infected with Amitsur's enthusiasm.

His involvement with the development of mathematics curricula went back to the late fifties. In an interview I conducted with him in April 1994, just four months before his untimely death, he recalled:

"I participated in the project, organized by Professor Frenkel. The university faculty was having a series of meetings with mathematics teachers in secondary schools. On this occasion I realized that there was a serious problem with our curriculum. It was obsolete. I could see no connection between mathematics (as I understood it) and what was taught in schools. I decided to try to introduce some changes to the program. I succeeded in getting the support of the mathematics inspector in the Ministry of Education and together with him started meeting with teachers."

These first brief encounters with teachers were to turn into a life-long affair. It was a happy, if also somewhat turbulent relationship. Professor Amitsur's positions with regard to mathematics teaching reflected, to a great extent, the views of the community of research mathematicians, concerned with the future of mathematics. "I am convinced that everybody should learn mathematics" he told me in the interview, and then explained:

"I believe that learning mathematics is equally essential as learning reading and writing. My argument is simple: today, information is conveyed to us through the language of mathematics. It's our duty to prepare young people for life in modern society, and mathematics is the language in which the modern society speaks."

When asked who should play the leading role in planning mathematics curricula for schools, he did not hesitate:

"Mathematicians, there can be no doubt about that. My experience taught me that teachers and researchers are too cautious, too fearful and skeptical about the possibility of change. They know that nothing will bring satisfactory results, that anything we try is bound to evoke negative reactions and social pressures. This awareness makes them unable to force the system to implement changes."

He had strong convictions as to what is and what isn't "real mathematics". To him, the current trend to teach mathematics by the laboratory-like explorations with the massive help of visualization and graphical means misses something very important.

"Observations may certainly help the student, exactly like shapes and bodies helps in geometry. It's definitely true. I am all in favor of using this additional sense - the sense of seeing - which in the past almost didn't play any role in mathematics. But in mathematics proper, in mathematics itself, what I really have to know is something different: it is how to draw conclusions from things I know about things I don't know yet. This cannot be done with pictures and other visual representations. In mathematics, I teach not only facts, but also special ways of thinking. The student must know how to construct proofs - proofs that won't depend on the specific drawings produced by the particular computer I use."

In his endeavor as a curriculum designer, his being a mathematician not always served him well. His views were not always shared by school teachers. He was sometimes accused of being confined in the ivory tower of academia and thus detached from reality. Mathematics teachers - many of them - said his aspiration to give a taste of "real mathematics" to every child in the country was but a dream. The criticism did not deter him. Although unequalled in his capacity for rational thinking, he was able to close his ears and mind to "rational" arguments whenever those were summoned to prevent an innovation and change, whenever they were used as a weapon against his basic values and convictions. With George Bernard Shaw he believed that in certain circumstances, "the man who listens to Reason is lost: Reason enslaves all whose minds are not strong enough to master her". And he was certainly strong enough to master the Reason. According to Shaw, a person who is too keen on following "common sense" is "a man without originality or moral courage". Shimshon A. Amitsur scored very high on both these accounts. With his personal example he proved Shaw wrong: he has shown that rationality and imagination may still come together and be found in one person.

Professor Amitsur's death will not put an end to the development of new mathematics curricula in Israel; but without Professor Amitsur, the spirit of the change will never be the same.

Anna Sfard,
The Hebrew University, Jerusalem, Israel

FUTURE CONFERENCES

8th SEFI European Seminar on Mathematics in Engineering Education, June 1995

This seminar will be held 28-30 June, 1995, at the Czech Technical University in Prague, the Czech Republic. The aims are 8 (i) to consider cooperation between educational institutions in Europe with a special emphasis on East-West cooperation; (ii) to discuss the role of mathematics in the engineering curriculum with an emphasis on the role of computer packages in engineering education; and (iii) to provide a forum for discussing new technologies in the teaching of mathematics. The programme will include plenary lectures, contributed papers, demonstrations, and a poster session.

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ICTMA-7, July 1995

The 7th International Conference on the Teaching of Mathematical Modelling and Applications will take place 16-20 July, 1995, at the University of Ulster at Jordanstown, Northern Ireland. The conference is organised by a committee chaired by Dr. Ken Houston, the University of Ulster.

The scientific programme includes plenary lectures, parallel sessions for contributed papers, poster presentations, participatory workshops and exhibitions/demonstrations.

Delegates' registration fee, which includes on-campus accommodation for four nights, meals, social programme, administration, and a copy of the conference proceedings, is £ 300.

For further information, please contact

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PME 19, July 1995

The 19th Annual Conference of the International Group for the Psychology of Mathematics Education (PME-19) will take place 22-27 July 1995, at the Mar Hotel, near Boa Viagem Beach. The conference is organised by the Graduate Programme in Cognitive Psychology at the Federal University of Pernambuco, Recife, Brazil.

For further information, please contact

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47th CIEAEM-Conference, July 1995

The 47th international conference, organised by La Commission Internationale pour l'Etude et l'Amélioration de l'Enseignement des Mathématiques (CIEAEM), will take place at the Faculty of Mathematics of the Technical University of Berlin (Germany), 23-29 July 1995. The organising institutions are Freie Universität and Technische Universität, Berlin, in cooperation with Universität Potsdam, Humboldt-Universität Berlin and the Max-Planck-Institute for Educational Research and Human Development, Berlin.

The International Programme Committee and the Local Organising Committee are both chaired by Professor Christine Keitel, Berlin. The main theme of the conference is Mathematics (education) and common sense: The challenges of social change and technological development. Key speakers include Professors Philip Davis (USA), Alan Bishop (Australia), Juliana Szendrei (Hungary), and Dr. Rijkje Dekker (The Netherlands).

The official languages of the conference are English and French.

Registration after 15 January 1995 will be at a fee of DM 200.

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PDME III, July 1995

PDME III, Political Dimensions of Mathematics Education Conference, will take place in Bergen, Norway, 24-29 July 1995. The official languages of the conference will be English and Spanish. For information on PDME see the article by Stieg Mellin-Olsen, ICMI Bulletin No. 34, page 16-17.

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IX IACME, July-August 1995

The Inter-American Committee on Mathematics Education, and the Chilean Society

of Mathematics Education announce that the IX Inter-American Conference on Mathematics Education (IX IACME) will be held at the campus of the Universidad de Santiago, Santiago, Chile, 30 July - 4 August, 1995. On this occasion the Inter-American Committee on Mathematics Education will be celebrating its 35th anniversary.

The main themes of the conference will address the mathematics education problems facing the growth of the Americas: How mathematics education can make a better contribution to the cultural, social and economic development of the Americas. The main activities will be plenary and parallel lectures, panels, oral communications, poster sessions, discussion groups and exhibition of materials. Parallel to these main activities there will be special conferences and workshops for mathematics teachers.

The official languages of the Conference will be: Spanish, English and Portuguese. There will be simultaneous translations from Spanish to English and vice-versa during the lectures and panel sessions.

The registration fee (after 31 May) is US\$ 200.

For registration and additional information, please contact:

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e-mail: <foteiza@euclides.usach.cl>

9th Central American and Caribbean meeting on teacher education and research in mathematics education, August 1995

This conference will take place 14-17 August 1995, at the Centro de Convenciones del ICE del Ministerio de Educación de Cuba, Habana, Cuba. The International Programme Committee is chaired by Professor Luis Campistrous, Instituto Central de Ciencias Pedagógicas, Cuba.

The scientific programme consists of plenary addresses, lectures, short courses, working groups, workshops, poster exhibitions, and exhibitions of educational materials. The conference language will be Spanish.

For further information, please contact

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SEMT 95, August-September 1995

The International Symposium on Elementary Mathematics Teaching will be held at the Faculty of Education of the Charles University, Prague (the Czech Republic), 28 August-1 September 1995. The programme, which is planned by an international programme committee, will concentrate on the teaching of mathematics to 6-10 year old children. The working language of the symposium will be English. The deadline for abstracts (20 lines) is 20 February 1995.

For further information, please contact

SEMT 95,
Department of Mathematics and Mathematical Education,
Faculty of Education,
Charles University
M.D. Rettigové 4
116 39 Praha 1
The CZECH REPUBLIC
e-mail: <novotna@earn.cvut.cz>

Mathematics Teaching, September 1995

The 11th annual Edinburgh conference on mathematics teaching for mathematics teachers at every level, from early primary school to final year of university, will take place 7-8 September, at Napier University, Edinburgh, Scotland. The conference is organised by Dr. John Searl, The University of Edinburgh. The scientific programme consists of four plenary lectures, a wide range of workshops and working groups, and an exhibition of books and teaching materials.

The registration fee is £ 26.

For further information, please contact

John W. Searl,
Department of Mathematics and Statistics,
The University of Edinburgh,

James Clerk Maxwell Building,
King's Buildings, Mayfield Road,
Edinburgh EH9 3JZ
SCOTLAND, UK
Tel: +44 131 650 5044 (or 5045)
Fax: +44 131 650 6553

Fourth Pan-African Congress of Mathematicians

This congress - 4th PACM, 1995 - will take place 18-26 September 1995 at the Al-Akhawayn University, Ifram, Morocco. The theme of the conference is *Mathematical sciences and the development of Africa: What challenges for the 21st century?* The scientific programme includes plenary addresses, invited parallel lectures, and contributed research papers, a poster exhibition, a scientific exhibition, and a special symposium on the theme of the congress. The congress is organised, on behalf of the African Mathematical Union in cooperation with La Société Mathématique du Maroc and the Al-Akhawayn University, of an International Programme Committee, chaired by Professor A.O. Kuku, Nigeria.

For further information, please contact

Ahmed Kerkour
Chair, Local Organising Committee
Secrétariat de la Société Mathématique du Maroc (SMM),
BP 1780,
Rabat,
MOROCCO
Fax: +212 7 775471

European Research Conference on the Psychology of Mathematics Education, September-October 1995

The aim of this conference, which will take place 29 September - 2 October, 1995, is to coordinate and strengthen European research in the field of the psychology of mathematics education. The conference venue will be Haus Ohrbeck near Osnabrück, Germany. The scientific programme includes an opening session, parallel presentations of research reports (30 minutes plus discussion), a poster session, and a plenary discussion of the future of PME in Europe. The conference language will be English.

For further information, please contact

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8th Annual International Conference on Technology in Collegiate Mathematics, November 1995

This conference, ICTCM-8, will be held 16-19 November 1995, at Adam's Mark Hotel, Houston, Texas, USA, and hosted by San Jacinto College. The conference is chaired by Sharon Sledge, June Bjercke, and Margaret Morrison, San Jacinto College.

For further information, please contact

Beth Sheehan
Addison-Wesley Publishing Company
1 Jacob Way
Reading, MA 01867
USA
Tel: +1 617 944-3700, ext. 2921
Fax: +1 617 944-8964

International Conference on Pure and Applied Mathematics, November 1995

A conference of this title will be held at the University of Bahrain, 19-22 November, 1995. For further information, please contact

A.Q.M. Khaliq
Conference Secretary - ICPAM95
Department of Mathematics,
University of Bahrain
P.O. Box 32038, Isa Town,
BAHRAIN
Tel: +973 688348

Fax: +973 682582
e-mail: <icpam95@isa.cc.uob.bh>

1st ACTM, December 1995

The 1st Asian Technology Conference in Mathematics will be held in Singapore 18-21 December 1995. The conference will be hosted by the Association of Mathematics Educators, Singapore, in conjunction with the Nanyang Technical University, National Institute of Education, Singapore, and Radford University, Virginia, USA.

The theme of the conference is Innovative Use of Technology for Teaching and Research in Mathematics. The 1st ACTM will provide mathematics educators, computer specialists, technologists, researchers, policy makers, and teachers with an opportunity to share and discuss the latest developments in their areas of specialization. The conference will also provide an avenue for the possibility of collaborative research among participants.

The scientific programme of the conference is planned by an International Programme Committee, chaired by Dr. Wei-Chi Yang, Radford University, Virginia, USA. Papers are invited from people involved in the use of technology in teaching and research in higher institutions and schools. The conference programme will include plenary lectures, paper presentations, and workshops on mathematics teaching and research with the use of technologies. Also an exhibition of educational products with the use of technology will be mounted. The working language will be English.

Abstracts not exceeding 200 words should be sent to

Fong Ho Kheong,
Chair, ACTM 95 Organizing Committee,
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469 Bukit Timah Road,
Singapore 1025,
Tel: +65 460 5310
Fax: +65 469 8952
e-mail: <fonghk@nievax.nie.ac.sg>

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Tel: +1 703 831 5332/or 5670
Fax: +1 703 831 6452

e-mail: <wyang@mathstat.ms.runet.edu>

SEACME 7, June 1996

The Seventh South East Asian Conference on Mathematics Education will be held at Hanoi University of Technology, Hanoi, Vietnam, 3-7 June 1996. The organising institutions include the Hanoi University of Technology, the Hanoi Pedagogical Institute No. 1, the Hanoi University, the Research Institute of Education Science, and the Vietnamese Mathematical Society.

The themes of SEACME 7 are Mathematics education in upper secondary schools, and Mathematics education for mathematicians, scientists and engineers, social scientists, and mathematics teachers. The programme will include invited lectures (delivered by international experts), working groups, topic groups, workshops, national presentations, and posters. Exhibitions of textbooks, software and other types of material are being planned as well. The conference languages will be English and French.

If you want to obtain the Second Announcement or other type of information, please contact

Nguyen Dinh Tri,
the Organizing Committee of SEACME 7,
Hanoi University of Technology,
Dai Co Viet Road,
Hanoi
VIETNAM

ICME-8, July 1996

See separate announcement elsewhere in this issue of the Bulletin.

Second European Mathematical Congress, July 1996

This congress will be held 21-27 July 1996 in Budapest (Hungary), hosted by the János Bolyai Mathematical Society. The Scientific Committee is chaired by Jürgen Moser, Germany, and the Organising Committee by Gyula Katona, Hungary.

To obtain a copy of the First Announcement, please contact

János Bolyai Mathematical Society,
Fő utca 68,
H-1027 Budapest
HUNGARY,

Tel: +36 1 201 7656
Fax: +36 1 201 6974
e-mail: <h3341sza@ella.hu>

Junior Mathematical Congress-96, July-August 1996

As a satellite conference to the above-mentioned Second European Mathematical Congress, this meeting - which aims at bringing together the future mathematicians of Europe - will take place 29 July - 2 August 1996 in Miskolc, Hungary.

The conference welcomes young people between 13 and 19, interested in mathematics, from all countries in Europe. It will provide an excellent opportunity for the participants to make friends and meet famous European mathematicians. In addition to new ideas, participants will become acquainted with several new branches and applications of mathematics as well as educational software and logical games. Apart from lectures by scholars, the participants may themselves give talks or exhibit posters. Those wishing to give a talk should submit a manuscript no later than 31 March 1996.

For further information and preliminary registration, please contact

Peter Kortesi,
Chair of the Junior Mathematical Congress-96,
Department of Mathematics,
University of Miskolc,
H-3515 Miskolc-Egyetemvaros, Pf. 10
HUNGARY
Fax: +36 46 365174
e-mail: <matjun@gold.uni-miskolc.hu>

The official languages of the conference are English and Hungarian. Contributions in Hungarian will be translated into English. Contributions in any other language are welcomed if supported by an English translation.

The deadline for preliminary registration is 1 October 1995.

The ICMI Bulletin on E-Mail

The ICMI Bulletin is stored as an ASCII file in the editor's (i.e. the ICMI Secretary's) electronic post 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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