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Secretariat
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University of Southampton
Southampton, SO9 5NH
England

The International Commission on Mathematical Instruction

BULLETIN NO.17

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University of Southampton
Southampton, SO9 5NH
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INTERNATIONAL COMMISSION ON MATHEMATICAL INSTRUCTION

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SIXTH INTERNATIONAL CONGRESS ON MATHEMATICAL EDUCATION

BUDAPEST, HUNGARY : 1988

It was with great pleasure that the János Bolyai Mathematical Society, the Federation of Technical and Scientific Societies, the Hungarian Ministry of Education and Culture, and the Hungarian Academy of Sciences learned of ICMI's decisions to accept their invitation to hold ICME 6 in Budapest.

Hungary has a long a proud tradition in mathematics and mathematics education and we are particularly pleased to act as hosts to so important an international meeting in this field.

The Congress will be held in Budapest - a city renowned for its beauty, culture and architectural interest - and will take place at the Technical University from 27 July to 3rd August, 1988.

We hope that the Congress will attract members from many countries; we extend a warm welcome to all and we hope that participants will take the opportunity not only to benefit from attending the Congress, but also to see more of Hungary and to become acquainted with its people, its natural attractions and its culture.

A. Hajnal,
Secretary General of the
János Bolyai Mathematical Society

ICME 5

The Fifth International Congress on Mathematical Education was held in Adelaide, South Australia from Friday 24 August to Thursday 30 August 1984.

It was attended by a total of 1984 (!) participants representing 69 different countries. The exact breakdown was as follows:

Argentina	3	Lebanon	2
Australia	814	Lesotho	2
Austria	1	Luxembourg	1
Barbados	1	Malaysia	7
Belgium	7	Mexico	6
Botswana	2	Mozambique	2
Brazil	2	Netherlands	17
Bulgaria	1	Nigeria	3
Burma	2	Norway	1
Cameroon	1	New Zealand	66
Canada	40	Philippines	3
Chile	3	Papua New Guinea	12
Denmark	5	Poland	4
Egypt	3	Qatar	1
Eire	1	Senegal	1
Fiji	1	South Africa	37
Finland	10	South America (?)	2
France	56	Saudi Arabia	1
Ghana	1	Singapore	6
Greece	1	Spain	2
Guam	2	Sudan	1
Hong Kong	1	Swaziland	1
India	5	Sweden	23
Indonesia	6	Switzerland	5
Iran	3	Tahiti	1
Iraq	13	Taiwan	4
Israel	1	Thailand	5
Italy	11	Tonga	1
Ivory Coast	10	Uganda	2
Jamaica	1	United Kingdom	86
Japan	4	U.S.A.	251
Kenya	173	U.S.S.R.	6
Korea	1	West Germany	32
Kuwait	1	West Samoa	1
		Zimbabwe	1

Full participants:	Women	543
	Men	1243
Full participants	Total	1786
Accompanying persons		198
Number attended Grand Total		1984
Total countries		69

The number of full members, 1786, was, surprisingly, only twenty or so less than the number registered at 1980 in Berkeley, USA. This was most pleasing in view of the long distances which many participants had to travel to ICME 5 and the worsening economic climate. Fewer countries (particularly those from the Third-World) were, however, represented. The percentage drawn from Australasia was approximately the same as that from North America at ICME 4.

Plenary lectures were given by Ubiritan D'Ambrosio, Jeremy Kilpatrick, Renfrey Potts and the ICMI President, Jean-Pierre Kahane. The major feature of the Congress was the time devoted to the fourteen action and theme groups. In addition there were presentations by various study and working groups, many short communications and a number of exhibitions. A most successful social programme was also arranged.

The general impression was that this was probably the most successful ICME yet. The credit for this must be shared between many people, for an international congress of this size and nature cannot be planned and implemented without the active cooperation and contributions of hundreds. However, whilst recognising this and the difficulty of singling out individuals for special mention, we should like to draw particular attention to the work of

M.F. Newman (Chair, International Program Committee)
Marjorie Carss (Chair, National Program Committee)
J.M. Mack (Chair, National Organising Committee)
R.B. Potts (Chair, Local Organising Committee)
J.P. Baxter (Congress Treasurer).

Congress Proceedings will, it is hoped, appear in 1985.

A.G. Howson

ICMI STUDIES

The work of collecting money to finance the ICMI studies continues. We should like to draw readers' attention to generous grants which have recently been received from the International Council of Scientific Unions and the French Mathematical Society (both specifically towards the cost of the seminar to be held in Strasbourg on 'The impact of computers and informatics on mathematics and its teaching') and from the Royal Society (London). There has also been a promise of further assistance from UNESCO.

National Representatives and others are asked to think of possible donors in their own countries and to take steps actively to assist in the raising of further finance. Precedents now exist!

GENERAL ASSEMBLY OF ICMI

A general Assembly of ICMI was held on Sunday 26 August, 1984 at the University of Adelaide. This was an important event for ICMI, since it is many years since its National Representatives were able to meet together, to make decisions, and to discuss policy with the Executive Committee. The meeting was attended by 26 National Representatives or their appointed deputies, together with observers from 3 non-ICMI countries. (Since the meeting two of these countries, Ghana and the Ivory Coast have applied for admission as members of ICMI.)

The meeting had to take formal decisions on two issues. The first of these was the acceptance of ICMI's accounts for the period 1 January 1983 - 30 June 1984. These showed a considerable improvement in the ICMI finances, although we are still not a rich organisation. Grants had been made to ICME 5 (US $11,500), to regional meetings in Japan (October, 1983) and Thailand (May, 1984) (US $2,400 in total), and to the symposium held in Warsaw in connection with the August 1983 International Congress of Mathematicians (US $4,000). This increased level of support was due to continuing grants from UNESCO and greatly increased support from the International Mathematical Union (IMU). A proposal from the National Representative of the USA that the President should express the Assembly's gratitude to the IMU for its increased financial aid was warmly supported.

The second major issue concerned the planning of future ICMEs. The recommendations printed in Bulletin 15 were approved with some small amendments made as a result of suggestions received from National Representatives. The revised regulations are printed later in this Bulletin. The discussion then ranged over wider issues connected with future ICMEs. The need to view ICMEs as opportunities to report the status quo, to initiate action and to define problems to be worked upon was particularly stressed.

The problem of National Contributions was discussed at length. There appeared to be a great wish to increase our knowledge of mathematics education elsewhere, but the dangers of giving/receiving false impressions as a result of short inevitably biased presentations were also expressed. The EC and the International Program Committee (IPC) were asked to consider the problem of comparative studies in greater depth. Criteria for the acceptance of proposals for the inclusion of group and project presentations within the ICME programme would also have to be established.

The need adequately to finance the IPC was expressed as was that to give as much aid as possible to participants from developing countries. It was suggested, and later agreed by the EC, that at future ICMEs a small surcharge ($10-20) will be added to the registration fee and used by ICMI for such purposes.

National Representatives were informed of the need to submit names for consideration as members of the IPC as soon as possible. These had to reach the Secretary by 1 October 1984 at the very latest. Suggestions were also requested (and these, too, could be made by any interested party) on how the sections might be

arranged at ICME 6 and also on the constitution of the section panel. Such suggestions should reach the Secretary by 1 May 1985 and all nominations should be accompanied by a short curriculum vitae and/or other supporting evidence (in particular, individuals' specific areas of interest and competence should be described).

The President then announced that the offer of Hungary to act as hosts for ICME 6 had been accepted by the EC. This decision was widely welcomed.

Amongst other points discussed were the ICMI studies, in particular, that on cognition. This last drew attention to the position of PME and other affiliated groups and the EC was asked to consider how such groups might be represented within the Commission, and in particular, at the General Assembly.

A. G. Howson

ICME 6

The ICMI Executive Council has recently been forming an International Program Committee for ICME 6, Budapest, 1988. Invitations will be sent to prospective members in December, 1984 and the names of the committee will be published in the next Bulletin. As will be seen from the planning procedures for ICMEs reprinted in this issue, the IPC when it meets in Summer, 1985 will have to determine sections for ICME 6 and also begin the process of naming section chairmen and panellists.

It is important, therefore, that advice and suggestions should be submitted by May, 1985. National Representatives, National Commissions and individuals are, accordingly, invited to submit their thoughts on how the sections at ICME 6 should be constituted. Comments on how the work of sections might be structured will also be welcomed (although this is not to be taken to imply that all sections will necessarily adopt the same working pattern). In addition, suggestions for possible chairmen and panellists should be submitted together with brief descriptions of their experience and work. More general comments referring to the general program of ICME 6 will also be welcome.

Suggestions should be forwarded either to the Chairman of the IPC (once the appointment is announced) or to the Secretary of ICMI.

A.G. Howson

THE PLANNING OF FUTURE ICMI PROGRAMMES

The following planning procedures were approved by the General Assembly of ICMI when it met in Adelaide in August, 1984.

The planning procedures are based on the assumption that an ICME must serve five major purposes: it must provide

(i) a means whereby educators from different nations can explain and show what is happening in mathematics education in their own countries, can learn what is happening in other lands, and can share experiences for their mutual benefit;

(ii) a forum for the exchange of information on what are currently identified as the most significant problems of mathematics education in various countries of the world;

(iii) a means whereby mathematics educators can learn of, and benefit from, recent advances in mathematics, other relevant disciplines, and technology;

(iv) a show-case for work of a recognised professional standard and, as such, a means whereby workers within the discipline/study of mathematics education can set and raise standards;

(v) an opportunity to develop on-going work and to initiate new internationally-based, co-operative schemes.

For administrative purposes Congress activities are separated into two distinct classes (whilst realising that aims (i) to (v) can be sought within each). These are referred to below as

A-type activities:

plenary sessions;
sub-plenary sessions arranged within sections;
working groups;

and

B-type activities:

national contributions;
project and group presentations;
poster sessions.

Administration

1. The IPC

The ICMI EC shall appoint an International Programme Committee consisting of 10 people, of which two to four come from the host country. The ICMI EC shall also appoint one of the 10 as Chairperson of the IPC - not necessarily a member from the host

country. These appointments are to be made at the EC meeting held at the preceding ICME or failing that within three months of that meeting.

The IPC shall have the duty of approving the academic programme of the ICME.

In particular, it shall have the responsibility for:

(a) determining the number of plenary sessions to be held and for inviting any plenary speakers. (It is accepted that one plenary lecture will be given by the President of ICMI on a topic of his/her choice. There will also be opening and closing sessions. During the latter a brief report on ICMI's activities will be presented. The IPC should identify plenary speakers and issue invitations at least two years prior to the ICME.)

(b) determining the sections into which congress activities will be divided. Once these sections have been decided the IPC will appoint for each section a panel chairperson and four further panel members. The IPC will also determine how many sub-plenary and working group sessions will be allotted to each section.

(c) appointing a committee (Committee B) of seven members (including the chairperson and at least one IPC member) to be responsible for organising the B-type activities and for ensuring that suitable provision is made for accommodation, technical back-up, etc.

When appointing section panels the IPC should seek to ensure as wide an international representation as possible and to secure an appropriate balance between members from developed and developing countries. However, the professional competence and knowledge of panel members must always be the over-riding consideration. National Representatives will be invited (via the Bulletin, ICMI General Assembly, etc.) to submit suitable names (together with a brief description of the person's background and contribution to mathematics education). Appointment of section panels is to be completed three years prior to the ICME.

Committee B will comprise mainly of members from the host country. However, the IPC will nominate at least one member from a non-host country and, in addition, a member involved in the organisation of B-type activities at the preceding ICME. Committee B shall be appointed at least 30 months prior to the ICME.

2. Section panels

Each section will be responsible for:

(a) submitting the names of sub-plenary speakers and titles to the IPC for its approval (to be done at least 15 months prior to the ICME);

(b) submitting the topics to be studied in working groups to the IPC for its approval, and also nominating leaders for these groups (to be done at least 12 months prior to the ICME).

It is expected that section panels will select sub-plenary speakers who have distinguished themselves through their research and/or developmental work, critical analyses, etc. within the preceding four years. The need to keep an international balance whilst maintaining professional standards is again stressed.

It is expected that the working groups will frequently be led by panel members.

3. Committee B

This committee will prepare a programme for B-type activities for approval by the IPC at least 18 months prior to the ICME. (Here 'programme' indicates a structure and not a detailed account - clearly the names of countries, groups and individuals wishing to contribute to sessions may not be known until later.)

4. Publications

The publishing policy is ultimately to be decided by the National Organising Committee (which will be legally responsible for the financial aspects of the Congress). However, it is to be determined after consultation with the IPC and the ICMI EC.

5. Affiliated study groups of ICMI

These would have no official standing so far as A-type activities are concerned. However, it is hoped that those closely connected with these groups will be represented on the Congress committees and appropriate section panels. The statutory duty of each study group to report on its work at an open session during each ICME will remain.

6. Publication of committee members' names

The names of those serving on the IPC and the section panels will be published in the ICMI Bulletin.

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(Readers are asked to notify the Secretary of any errors in this list)

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THE INTERNATIONAL GROUP FOR THE PSYCHOLOGY OF MATHEMATICS EDUCATION

Introduction

The International Group for the Psychology of Mathematics Education (PME) was organised at ICME 3 (Karlsruhe, 1976) as a result of a working party set up at ICME 2 (Exeter, 1972). It has been granted formal recognition as an official study group by ICMI. International conferences of the group have been held annually since 1977 and the group has become a formal autonomous body since the adoption of its constitution in August 1980. There are currently more than 200 active members from all parts of the world.

Interest in the activities and proceedings of PME led to the founding of PME-NA in 1979. This group also meets annually in North America and produces its own set of proceedings. Currently, because of the interest generated in this part of the world by PME 8 and ICME 5, suggestions are being made that a chapter based on Asia and the Pacific region be formed.

Contribution to ICME 5

Four presentations were made which endeavoured to link important aspects of PME researchers' findings in the area of cognitive psychology with the practice of teaching mathematics in schools:

Presentation (i) What we learn from an analysis of students' work and interviews with students.
(Coordinators: Balacheff (F), Hart (UK), Streefland (Neth.)).

Presentation (ii) The long term evaluation of students' concepts and levels of understanding in number and the operations of addition and subtraction.
(Coordinators: Herscovics (Can.), Bergeron (Can.), Comiti (F)).

Presentation (iii) How students' conceptions conflict and change in the process of learning.
(Coordinators: Burton (UK), Hasemann (West Germ.), Lowenthal (Belg.)).

Presentation (iv) The nature of mathematical thinking: intuition, operations, discovery and proof.
(Coordinators: Vergnaud (F), Lesh (US), Tall (UK), Janvier (Can.)).

Research Themes in PME and PME-NA Proceedings

PME (since 1976) and PME-NA (since 1979) have brought together psychologists, mathematicians, mathematics educators, philosophers and computer scientists each year to contribute to conferences on the problems related to learning and teaching mathematics.

Each annual conference has published the papers relating to that conference as a set of proceedings. A perusal of the two most recent meetings of PME and PME-NA show that a total of 121 reports, representing over 150 separate researchers, have been published in this way in the last 12 months. The themes represented in these volumes focus on the psychological aspects of learning and teaching mathematics and the implications thereof for curriculum and instruction. The following are examples of major themes running through the contributions:

1. Cognition and Cognitive Theory,

2. Theories of Teaching and Learning,

3. Problem Solving,

4. Mathematical Topics, for example, Proportional Reasoning, Operations, Relational Numbers, Probability, Geometry, Algebra, Early Arithmetic.

5. Miscellaneous; for example, attitudes, language, influence of gender, the use of technology.

Obviously there is considerable overlap between the categories listed but this is inevitable because of the focus of PME conferences. The proceedings show that a substantial body of knowledge in the area of psychology in mathematics education has now been gathered and progress is being made with respect to improving mathematics education in various parts of the world as a consequence. In respect of this last point it should be noted that some contributions, first made at a PME conference, have had significant impact on thinking about the instruction in mathematics education in several different parts of the world.

Development in PME

PME is a dynamic group. Its annual conference incorporates not only self-initiated reports by individuals and teams of researchers but it also encourages theme groups and working parties to work on long term projects over the year between conferences and to report to the conference as a whole. It is expected that some of these projects will result in PME publishing occasional monographs in addition to its conference proceedings in the near future.

The original aim of PME to promote international contacts and exchange scientific information in the area of psychology of mathematical education has been achieved to such an extent that now there is an extensive network of researchers around the world who work together between conferences on specific problems.

K.F. Collis
President PME

THE INTERNATIONAL STUDY GROUP FOR THE RELATIONS BETWEEN THE HISTORY AND PEDAGOGY OF MATHEMATICS (HPM)

The HPM met for two half-days on the Sturt Campus of the South Australian College of Advanced Education, Bedford Park, SA before ICME 5. David Wheeler (Concordia University, Montreal, Quebec) served as program chairman and presider. Short presentations by Otto Bekken (Norway), Florence Fasanelli (USA), John Berry (Canada), Arthur J. Gilks (Australia), Hans-Georg Steiner (West Germany), Ubiratan D'Ambrosio (Brazil), Jack Gray (Australia), Yoshimasa Michiwaki (Japan), David Pimm (United Kingdom), and John McQualter (Australia) provided the basis for excellent discussions. Among the topics were: the preparation of teaching material on historical themes, the interplay between the history of art and the history of mathematics in classroom teaching, history of mathematics for preservice elementary school teachers, John Napier and the discovery of logarithms, the place of ethno-mathematics in history courses, and relations between the history of mathematics and the teaching of pure mathematics.

George Booker (Australia) served as coordinator for the four sessions sponsored by the HPM during the Congress. At the first session Bruce Meserve (USA) provided a brief introduction to the HPM, its aims, purposes, and activities and George Booker described the use of ideas from the history of mathematics in teaching mathematics at all levels across Australia. In later sessions Rina Hershkowitz (Israel) described a source book for inservice and preservice courses from the Weizmann Institute of Science in Israel, Martha Menghini (Italy) historical miniatures for talented students prepared at the University of Rome, Amy Dahan (France) the "Mathematique au fil du ages" project and Jacques Barowczyk some of the work of the IREM. In the final session Florence Fasanelli (Sidwell Friends School, Washington, D.C.) used works of such artists as Dürer, da Vinci, and Klee to illustrate her work with gifted students on the interplay between the history of art and of mathematics and Israel Kleiner (York University, Ontario) spoke on "Why the teacher of mathematics should know the history of mathematics." The meetings were well attended and the presentations were very well received.

The meetings provided an opportunity to expand the group of active leaders and to broaden the activities of the HPM. The co-chairmen for the next four years are Ubiratan D'Ambrosio (Universidade Estadual de Campinas, Caixa Postal 1170, 13100 Campinas -- SP -- Brazil) and Christian Houzel (France). The Newsletter Editor is Charles V. Jones (Department of Mathematical Sciences, Ball State University, Muncie, Indiana 47306). The Advisory Board consist of Otto Bekken (Norway), George Booker (Australia), Sergei Demidov (USSR), Paulus Gerdes (Mozambique), Maassuma Kazim (Egypt), Bruce Meserve (U.S.A.), David Pimm (United Kingdom), Roland Stowasser (West Germany), Lee Peng Yee (Singapore), and David Wheeler (Canada).

Future meetings are contemplated (a) in conjunction with the International Congress on the History of Science at Berkeley in August 1985, (b) in conjunction with the International Congress of Mathematicians at Berkeley in August 1986, and (c) in 1987, in addition to ICME-6 in 1988.

Bruce E. Meserve, University of Vermont
Cochairman HPM, 1980-1984.

IMO NEWS

The XXV International Mathematical Olympiad was held in Prague, Czechoslovakia, June 29 to July 10, 1984. 34 countries participated, including Cyprus and Norway which sent competitors for the first time. There were 12 girls among the 192 competitors, of whom Karin Gröger (DDR) scored full marks.

There were two new events in the programme of the XXV IMO. Participating countries were invited to prepare and present at a Symposium a paper explaining how mathematically gifted children are taught and how their IMO teams are selected. To complement these presentations there was a display of text books, magazines and other enrichment materials. Although not all countries made a presentation at the Symposium, the talks given were very interesting and provided an opportunity for Leaders to learn about other countries' methods.

One afternoon during the IMO was used for a series of group activities, games and competitions for the team members. This well-planned event provided much enjoyment for those who took part and offered opportunities for IMO competitors from different countries to talk and work together. Diplomas were awarded to winning groups and individuals!

Future IMOs

The XXVI IMO will be held in Finland, from 1st to 10th July, 1985. The following year the IMO will be held in Poland.

J.W. Hersee

A BRIEF HISTORY OF IOWME

The International Organisation of Women and Mathematics Education came into being at ICME 3 in Karlsruhe in 1976, at a meeting arranged during the course of that congress to discuss the question of 'Women and Mathematics'. The calling of that meeting was initiated by two Australian women, Jan Kennedy and Nancy Shelley, who were struck by the lack of representation of women as speakers, panel members or presiders, despite the fact that nearly 50% of those attending the congress were women.

Eight years later, a somewhat more enlightened view is taken about women and the study of Mathematics, and it is now acknowledged that much human potential is being lost by the fact that so few women consider Mathematics to be a subject for them to study. It may, therefore, be a surprise to some to learn what the reaction was to the calling of that first meeting, to holding it, and to its outcomes. For the record, however, it needs to be told.

Having booked a room and time for the meeting with the appropriate office, we put up notices around the campus which said simply, in three languages: Women Participants of Congress are Invited to Meet on Friday at 1 p.m. to Talk. Bring Your Lunch. Room K.

A male colleague who assisted in putting up notices was amazed to find himself verbally abused by another male participant as he put the notice on the door of one of the buildings! That colleague was heard to recall the incident at ICME 5 - the heat of the argument was still vivid in his memory!

About fifty people attended the meeting - both women and men - and my first task was to ensure that everyone present could have the comments translated into a language which she or he could understand, for, of course, we had no official facilities for this. I then asked if people had any comments to make about:

1. the place of women at this congress;

2. the relevance for women of the things that had been discussed.

Participation was right across the group and concern was shared; a need was expressed, and ways of meeting that need were suggested and adopted. The third question that was put was 'Should we be giving more attention in future ICME Congresses to girls in Mathematics in secondary schools?'

It was agreed to set up IOWME whose purpose is:

1. to bring together those who are concerned with the subject of women and mathematics,

2. to circulate among members any research already available concerning women and mathematics,

3. to found branches in as many countries as necessary, and

4. to encourage further research into

(a) why so few women study mathematics, and

(b) what are the job possibilities for those who qualify.

The executive of IOWME consisted of 7 women, one from each of France, West Germany, Sweden, Hungary, U.S.A. and Australia, and each undertook to set up a branch in her own country along whatever lines were applicable and to pursue the general areas of IOWME in the most suitable way. Nancy Shelley was asked to be the International Convenor for the next four years.

In addition to this it was felt that some expression of our discontent and dissatisfaction with the organisation of ICME should be given to the Congress and the basis of a resolution was outlined. The details of this were left to the executive to deal with, and we were requested to see that the resolution was presented at the final session.

The statement was:

A group of some fifty men and women of the Congress who met to discuss the question of 'Women and Mathematics' approved the motion:

That we regret the poor representation of women at all levels: in delivering main papers,
on panels,
as reporters, and
in the planning of this 1976 Congress,

and make the following three suggestions. That in 1980

1. a group of women be included in the Organisational Committee;

2. that a main speaker (preferably a woman) be invited to speak on some aspect of women and mathematics;

3. that some opportunity be made for people interested in women and mathematics to meet, probably more than once.

The meeting was a very positive one and we felt that an historic step had been taken.

I was puzzled that Jan, who had been beside me at the beginning of the meeting, had disappeared and took no part in the discussion. When I saw her later, I said: 'Jan, what happened to you?' She replied: 'What happened to me was that Denis (her husband) and I spent the entire time trying to prevent some people at the door from breaking up the meeting! They maintained it was an illegal meeting and we had no right to hold it.'

Our next difficulty arose when we tried to get our resolution read at the final session. Initially I was told that it was out of order because all matters to be included in the

Vice-President's report had been decided the previous evening - although no public mention of this fact was ever made to the Congress. At length, I persuaded one of the executive to read our resolution. He then undertook, without promises, to see the other members of the executive of ICMI to seek their agreement to its being included.

Meanwhile, coloured pens and large sheets of paper were obtained and the resolution was written out in three languages and placed in the foyer. Just as the final session began I was told that if the Vice-President saw fit, it would be included. He did read it as the final item of his report and it brought laughter from the assembly as he read. However, at the conclusion of his reading there was applause for it.

Throughout the next four years there was correspondence between the national coordinators and some branches were founded. There was a great deal of activity in the USA. leading up to ICME 4 in Berkeley in 1980, and much of our Karlsruhe resolution was put into effect.

There were 4 sessions allotted to Women and Mathematics and 2 slots for IOWME to meet for discussion and organisational matters. In early 1980, Dora Skypeck wrote that "of the 430 speakers or panel members in the program, 88 were women and that 12 or so women have been asked to serve as presiders." She concluded with the comment "It is evident that the issue you raised at the Karlsruhe Congress has had an impact on the planners of this Congress."

At the second business meeting, Nancy Shelley was asked to continue as International Convenor for the next four years, and 14 national coordinators were found, an increase of 6 on the previous four years, with 2 for the USA. Each country would pursue the subject as best suited the local situation.

The Australian branch of IOWME held a 2-day national conference in January, 1982, in Canberra, and research and experience were shared. Recommendations were also made concerning ICME 5 and passed on to the organisers.

Also in 1982, An International Review of Gender and Mathematics was published by ERIC. This was edited by one of our foundation members, the national coordinator for West Germany, and six of the nine contributors were national coordinators of IOWME.

Over these four years a great deal of work has been done in relation to both girls and women and Mathematics. Much of this has been initiated by women concerned with equal opportunity and often not directly involved in Mathematics. This should be salutary; at the same time it bears out the wish of the Karlsruhe meeting to include those who may not be involved in mathematics education, yet are concerned with the issue - hence our title: Women and Mathematics Education.

In 1984 at ICME 5 in Adelaide, 4 sessions were held on Women and Mathematics under the Topic Areas and Study Groups Section of Congress. In addition, 2 sessions were scheduled for business

meetings, although a more appropriate time for these would be something to be desired at future congresses.

At the first of these business meetings, a group a five women were asked to seek an opportunity to speak with the President, Jean-Pierre Kahane, and others on the executive, to discuss the place of women in the running of the congress, their representation on committees, the possibility of guidelines for organisers, speakers and in relation to language and content; the possibility of representation on IMU, and, finally, the relationship of IOWME with ICMI. We had a very profitable meeting, and it was decided at the next meeting of IOWME to proceed with affiliation.

IOWME has also decided to produce a newsletter and Mary Barnes, Australia, is the Editor. The new convenor of IOWME for the next 4 years is Leone Burton, UK.

In conclusion, I should like to make the following comments. The study of Women and Mathematics is now generally recognised as a serious one. Certainly many people have accepted the necessity for greater participation of women in Mathematics and in Mathematics Congresses. Yet, in attending this issue of equity, what should not be overlooked is the contribution and insights women can make to Mathematics - as women - which has the potential to affect the ~~development~~ of the subject itself.

Nancy Shelley
Foundation Convenor of IOWME

TEACHING MATHEMATICS AT UNIVERSITY

Details of this ten-week course (briefly described on p.27 of Bulletin 16) can be obtained from The Secretary, Centre for Mathematics Education, The University, Southampton, SO9 5NH, U.K. The course which is intended for young university lecturers from the developing countries is supported by the British Council and the Overseas Development Administration.

MATHEMATICS FOR ALL

The general theme of 'Mathematics for all' is one on which ICMI has recently placed much emphasis. It will, of course, be a major consideration in the proposed ICMI study on School Mathematics in the 1990s. For that reason we print below a brief report from the group which considered this theme at ICME 5. Further brief papers on this issue (of a type similar to those on 'Mathematics and Language' published in previous Bulletins) are invited from National Representatives and other readers.

Report on the Work of Theme Group 1

"Mathematics for All" at ICME 5

Many factors have brought about a change in the overall situation of mathematics education. These include the move to universal elementary education in developing countries, the move to universal secondary education in industrialised countries (where there have also been growing demands for mathematical competence in an increasingly technologically and scientifically oriented world) and from the experience gained with worldwide curriculum developments such as the new mathematics movement. The tacit assumption, that what can be gained from mathematics can be gained equally in every culture and independently of the character of the school institution and the individual dispositions and the social situations of the learner, turned out to be invalid. New and urgent questions have been raised. Probably the most important ones are:

- What kind of mathematics curriculum is adequate to the needs of the majority?
- What modifications to the curriculum or alternative curricula are needed for special groups of learners?
- How should these curricula be structured?
- How could they be implemented?

A lot of work has already been done all over the world in attempts to answer these questions or to contribute to special aspects of the problem.

- ICME 4 yielded several presentations of results concerning universal basic education, the relationship of mathematics to its applications, the relation between mathematics and language, women and mathematics, and the problems of teaching mathematics to special groups of students whose needs and whose situations do not fit into the general framework of traditional mathematics education.
- The Second International Mathematics Study of the International Association for the Evaluation of Educational Achievement (IEA) dealt much more than the

first one with the similarities and differences of the mathematics curriculum in different countries, and the different conditions which determine the overall outcome in mathematical achievement. The IEA collected data on both the proportions of students (male and female) studying mathematics at different age levels in various countries and their respective attainments. Although final reports on the Second International Mathematics Study are not yet available, preliminary analyses of the data have already produced useful results.

- In several countries national studies have been concerned with the evaluation of the mathematics education system. An important recent example is the Report of the Committee of Enquiry into the Teaching of Mathematics in Schools in England and Wales (commonly known as the Cockcroft Report) in 1982.

- Last, but not least, there are many detailed studies, projects and proposals from different countries dealing with special aspects such as:

  - teaching the disadvantaged;
  - teaching the talented;
  - teaching mathematics to non-mathematicians;
  - teaching mathematics in the context of real life situations;
  - teaching mathematics under atypical conditions, etc.

At ICME 5, the following papers were presented on a variety of topics related to the theme Mathematics for All.

Josette Adda (France)	Fighting against school failure in mathematics.
Afzal Ahmed (Great Britain)	The foundations of mathematics education for all.
Achmad Arifin (Indonesia)	Universal mathematics education.
Andy Begg (New Zealand)	Alternative mathematics programmes.
David Carraher (Brazil)	Having a feel for calculation.
Terezinha Carraher (Brazil)	Can mathematics teachers teach proportions?
Kathryn Crawford (Australia)	Bicultural teacher training in mathematics education for Aboriginal trainees from traditional communities.

Peter Damerow/ Ian Westbury (FR Germany/USA)	Mathematics for all: conclusions drawn from the experiences of the New Mathematics movement.
Sherry Fraser (USA)	EQUALS: An inservice program to promote the participation of underrepresented students in mathematics.
Pam Harris (Australia)	Is primary mathematics relevant in tribal Aboriginal communities?
Takashi Izushi/ Akira Yamashita (Japan)	On the value of mathematics education retained by the social members of Japan in general.
Manfred Klika (FR Germany)	Mathematics for translators specialised in scientific texts - a case study on teaching mathematics to non-mathematicians.
Ulla Kuerstein Jensen (Denmark)	Upper secondary mathematics for all? An evolution and a draft.
Jan de Lange (Netherlands)	Mathematics for all is no mathematics at all?
Jean-Claude Martin (France)	Mathematics for all the pupils: an indispensable renovation of education.
Genichi Matsubara/ Zennosuke Kusumoto (Japan)	Arithmetic pedagogy at the beginning of the school system in Japan.
Bienvenido Nebres (Philippines)	The problem of universal mathematics education in developing countries.
Allan Podbelsek (USA)	Realisation of a mathematics program for all.
Howard Russell (USA)	Mathematics for all: SIMS data.
Analucia Schliemann (Brazil)	Mathematics among carpentry apprentices: Implications for school teaching.
Roland Stowasser (FR Germany)	Problem oriented mathematics can be taught to all.
Virginia Thompson (USA)	Family math.

The presentations given at the sessions of the theme group can be considered as important efforts to contribute to the great program of teaching mathematics successfully not only to a minority of selected students but teaching it successfully to all. But in

spite of all these efforts it has to be admitted that the answer to the question, "What kind of mathematics curriculum is adequate to the needs of the majority?", is still an essentially open one. However, the great variety of the issues connected with this problem which were raised in the presented papers makes it at least clear that there will be no simple answer. Thus the most important results of the work of this theme group at ICME 5 may be that the problem was for the first time a central topic of an International Congress on Mathematical Education, and that, as the contributions undoubtedly made clear, this problem will be one of the main problems of mathematical education in the following decade.

Peter Damerow
Mervyn Dunkley
Bienvenido Nebres
Bevan Werry

A NEW PERIODICAL ON MATHEMATICS EDUCATION

A yearbook "Mathematics Education Research in Finland" will be published annually (in English), beginning 1983. More information can be obtained from the editor, Pekka Kupari (University of Jyväskylä, Institute for Educational Research, Seminaarinkatu 15, SF-40100 Jyväskylä 10, Finland). The same address may be used for orders for one year only (price 20 Fmk for 1983) or for standing orders.

UNESCO STUDIES IN MATHEMATICS EDUCATION

Volume 3: The mathematical education of primary-school teachers

This latest volume in the series is part of UNESCO's programme aimed at helping to improve mathematics education. Problems of mathematics education occur world-wide. Their nature, and method of solution however will vary from country to country, but we can learn from one another.

This volume exemplifies these observations, for there are contributions from many parts of the world, brought together and edited by Robert Morris. There are seventeen articles, with authors from Africa, the Caribbean, Europe, North and South America, Australasia, Fiji and the Philippines. It would be interesting to have seen discussions from such major parts of the world as China, India, Japan or the Soviet Union.

The first two articles discuss general trends in primary mathematics and implications for teacher education. The power of mathematics in application is brought out in a chapter concerning the relationship of mathematics with the environment, and this is followed by a discussion of the role of educational theory. An important article on calculators and computers takes up a theme which is a concern of ICMI at many levels. Conceptual difficulties are discussed, in relation to language, and this chapter echoes some of the points made on this topic in previous issues of this Bulletin. The following three articles concern concepts also in particular areas, two being concerned with geometrical visualisation, and the third with the difficulties of modelling verbal problems mathematically. There are five contributions covering a variety of aspects of pre- and in-service education, including two case-studies from Swaziland and Brazil. The final three chapters concern institutional support for teachers, and contain accounts of the teachers association's work in Ghana, a general discussion of the role of mathematics clubs in schools, and an account of the work of the IREM in France.

All the articles in this book are in English, but UNESCO is planning to provide French and Spanish editions later this year.

Volume 2 in this series examined goals of mathematics education. One of the significant points made in the second article in this volume is that the goals which teacher educators have for mathematics education, and which they attempt to impart to their students, are often in conflict with the goals which the school system itself seeks to implement. This is a major example of the social difficulties which are superimposed onto the complex tasks of mathematics education itself.

K.E. Hirst

MATHEMATICS LEGISLATION IN FLORIDA (USA)

We mathematicians/mathematics educators often talk a great deal among ourselves about the need for improving school mathematics. We even serve on national commissions and then discuss their recommendations at great length among ourselves. Too often these recommendations remain simply that, and absolutely nothing happens. In my opinion, we need concrete examples of nations/states that are implementing improvements through legislative action. My meagre experience indicates, regrettable as it may be, that government leaders are sometimes more interested in what the neighbouring nation/state is doing than in any absolute standard of excellence. Thus, it may be useful to know what one state has done.

Two years ago, I had the honour of serving on the Speaker's Task Force on Mathematics, Science, and Computer Education of The Florida House of Representatives. Almost all of our recommendations were incorporated into the laws of the State of Florida at a cost of $450,000,000. Florida does not have an excess of dollars, yet our visionary leaders have decided that the preparation of our children for life in the 21st century demands that education in general, and mathematics/science in particular, be a top priority. We are now seeing indications that Florida is on its way to excellence in mathematics.

My desire is that other nations/states will also make the necessary financial commitment for improved mathematics instruction, even if it comes from a sense of competition. The following is a summary of 1983 Florida Education legislation in mathematics and science.

Over the past three years the USA, along with several other nations, has become increasingly concerned about the quality of mathematics and science (MS) in our schools and universities. In particular, the political leaders of Florida, with ultimate responsibility for 1,500,000 school students and 500,000 tertiary students, became alarmed by falling test scores, declining teacher preparation programs, lack of public awareness of scientific and technological issues and our nation's technological state in the world.

As a result, the Florida Legislature passed landmark legislation in education. The primary focus was to provide for excellence in our public schools. Three major laws were passed and funded, all of which were precedent setting for the nation. These include merit pay for teachers, a comprehensive bill to meet critical needs in MS, and mandated rigorous statewide curriculum standards.

Teachers will be paid based on merit, including tests of subject areas. A new delivery system for inservice education is provided. New teachers must complete 450 hours of university instruction in their specialization outside the faculty of education. Large appropriations are made for MS laboratories. Summer camps in MS are funded. Schools, universities, and business join cooperatively to form regional centres of excellence in MS. State tertiary institutions receive extra money for programs of

excellence in MS. Feasibility planning grants are available for centres for academically talented school students in MS. The school day is lengthened for more MS instruction.

We citizens of Florida now expect spectacular results from our $450,000,000 investment!

Professor Don Hill
Mathematics Department
Florida A&M University
Tallahassee, FL 32307

(Detailed information is available from the author.)

SEFI WORKING GROUP ON
THE MATHEMATICAL EDUCATION OF ENGINEERS

Second European seminar on mathematics in engineering education:

The impact of computers, particularly microcomputers
28th - 30th March 1985
Danmarks Ingeniørakademi, Lyngby, Denmark

Following the successful first seminar on Innovation and Development in the mathematical education of engineers, held at the University of Kassel in early 1984, the working group is organising its second seminar in March 1985. The seminar theme is to be the impact of computers, in particular the effect of the increased availability of microcomputers on mathematics in engineering programmes. In addition to providing opportunities for discussion of existing or anticipated direct effects on syllabuses in mathematics, the intention is to provide a forum for the review of computer based or computer motivated teaching/learning methods. As engineering evolves, mathematics requirements will develop to meet the technological demands and contributions are particularly welcome from engineering teachers with interests in this area.

Intending contributors or participants should contact either,

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