

ICMI

Bulletin

of the
International Commission
on
Mathematical Instruction

No. 13

February 1983

Secretariat
Faculty of Mathematical Studies
University of Southampton
Southampton, SO9 5NH
England



The International Commission on Mathematical Instruction

Bulletin No. 13

February, 1983

Editors: Keith Hirst and Geoffrey Howson
Faculty of Mathematical Studies
University of Southampton
Southampton, SO9 5NH



A MESSAGE FROM THE PRESIDENT

Let me first express my high consideration for Professor Hassler Whitney, our Past President, and for the retiring Executive Committee. A symbol of continuity can be found in this Bulletin with the message of Professor Whitney as the retiring President and my first address as his successor.

The new Executive Committee has two major tasks: to define the main orientations of the Commission, and to try to have it work as an active and living body.

What is the purpose and role of ICMI? Mathematical education raises many problems. Can we deal with all of them? Shall we seek an "ICMI approved" solution for some of them? A first exchange of views inside the Executive Committee establishes a firm negative answer to both questions, and a quite different approach.

We think the main purpose of ICMI is to further mathematics education by helping to identify key problems and to create conditions for exchange of views and information, and a structure for cooperation and extended communication. Another role of the Commission is to secure public appreciation of the importance of mathematics education.

As an example of a key problem I should like to mention the general theme of mathematics, computation and computers: how do the means of computation influence the most general mathematical concepts (for example, what does solving an equation now mean?), how can the modern tools of informatics help us to renew the ways of teaching mathematics (geometry, probability and mechanics, as well as algebra and analysis), how does the spread of computers influence our views on what is desirable mathematical knowledge for students to possess?

Other themes deserve equal consideration. I am thinking of mathematics and cognition, school mathematics in 1990, and mathematics as a service subject (what to teach biologists, engineers, etc... and how?). Perhaps I shall return to them in another issue of the Bulletin.

For exchange of views and cooperation we shall use the Bulletin, the international study groups, symposia, regional meetings, and the International Congress on Mathematical Education (ICME). This Bulletin contains some information on these. ICME 5 will be held in Adelaide in 1984. It is already time to think about the site of ICME 6 in 1988, and also about the role of ICMI as a part of the International Mathematical Union in order to ensure a real linkage between research workers and teachers.

As you may see the new Executive Committee has much to do in defining more precisely the main orientations of the Commission. This is a necessary first step, but it will not be sufficient, for, in order to make our Commission work as a coherent, active and living body, we shall need the participation of all national delegates.

We have a duty to put into action the terms of reference for ICMI adopted by the Executive Committee of the International Mathematical Union in April, 1981. Dr. Geoffrey Howson and myself will present the ICMI Executive Committee with proposals to this effect. It will be a great help for us if all national delegates reply to the letter I sent them at the very beginning of our term, January 1, 1983. We have already received several most interesting letters, from the largest countries of the world and from the smallest states, such as Luxembourg. These have offered a rich experience and original views. Let me mention also the personal interest of Professor O. Lehto, Secretary of the IMU, in the life and work of our Commission.

The International Congress of Mathematicians in Warsaw will be an opportunity for our Executive Committee to meet. If many national delegates intend to be present at the Congress, we can also plan to have an informal meeting of the Commission. A General Assembly of the Commission will be held at the Adelaide Congress in 1984. Such meetings are good opportunities for contacts and exchanges of views. However, we certainly cannot expect them alone to provide a real life for our Commission. I strongly suggest the exchange of letters and documents as a most efficient way to keep us in contact.

The linguistic question can be a serious obstacle for communication but we must try to overcome the problems and difficulties. As a first step I suggest that anyone should feel free to express himself in the language he finds most convenient. Mathematics has to be taught in all languages of the world, and probably no other science has the same intimate relation with the language it uses. It is a special duty of every mathematics teacher to select within his own language the most appropriate way to express mathematical concepts, tools and theories. Unfortunately this rich experience cannot be reflected when we speak or write in a foreign language. The exclusive use of English in this Bulletin is solely to facilitate the rapid communication of straightforward information; we remain open to all proposals which would enable us to widen our linguistic spectrum.

J-P. Kahane

A MESSAGE FROM THE RETIRING PRESIDENT

With the term of office of the present ICMI Executive Committee coming to an end, I wish to thank all its members and all who have worked with us for all the fine progress that has been achieved. We are a small group with minimal resources, yet can help in worldwide problems through communication, cooperation and aiding others in their endeavors. Our warmest thanks go to our parent body, the International Mathematical Union, and to Unesco for their invaluable support. I also welcome the incoming Executive Committee and look forward to their carrying on our work in a fine manner. This includes the hope that the Bulletin will get back onto a steady schedule.

The work of ICMI is becoming more global in character, and this increases the difficulty of effective communication and organization. And since education involves social and political issues, our job is far more complex than that of the IMU. I believe however that we are increasingly becoming an aid to the solution of vastly difficult problems. Our health is shown by the congresses, the regional conferences, the study groups, and even more by developments, often subtle in kind, that can be seen as resulting from efforts of ourselves and many others in our common purpose of improving mathematics education on a worldwide basis.

To close, I want to say a few words about what I see as a major challenge to mathematics educators. There is plenty of proof in many ways that preschoolers who have learned to communicate through their mother tongue can also learn mathematics as a tool far more successfully than is usual in school. The failure can be seen in the usual classroom process. The teacher teaches, and the students try to understand in some (unsuccessful) sense and remember. It is promoted by the teacher presenting material and explaining, taking away the students' own thoughts; so the one great need, for the student to get practice in working through the whole meaning of a process, is mostly missing from the classroom. It is no wonder that they cannot problem solve; instead, their growth is restricted.

A return of a good part of the responsibility to the students, from the first grade on, is essential for true progress. This can be accomplished bit by bit with a given teacher, or in a more rapid manner. Moreover, it has been done in many places and times, mostly forgotten by professionals and the public. I will write more on this in another place.

Hassler Whitney

31 December, 1982.

EDITORIAL NOTE

This is the first issue of the Bulletin under our editorship and we hope that readers will find it both of interest and value. Its publication is greatly facilitated by a generous grant from UNESCO, whose contract serves well to define our conception of the Bulletin's role: 'to improve the functioning of ICMI through close ties with its National Representation and to disseminate useful information to the international mathematics education community. Such information might include, besides specifically ICMI related matters, reports of regional and national activities and selected literature in mathematics education'.

As readers will see, much of this issue is of necessity concerned with matters directly relating to ICMI and its affiliated working groups. However, we do provide some information on non-ICMI activities. In particular, we carry the first of a number of articles on international journals and referencing services for mathematics education. In the next issue, planned for October 1983, we shall begin a second series on institutions for the development of mathematics education with an article describing the work of the IREMs in France.

It is also intended to nominate specific topics for consideration in particular issues of the Bulletin. Thus, for example, in the October, 1983 issue we wish to devote space to 'mathematics and language'. The 1974 ICMI/UNESCO seminar in Nairobi prompted considerable study of the interaction of language and mathematical education. What is happening now in different countries throughout the world? We hope that national groups will send us brief descriptions of work in progress.

In this issue all the contributions have been solicited or supplied by the editors. We hope that National Representatives and others who read this Bulletin will now take the initiative and send us material which they think would be of interest to the international community of mathematics educators which the Bulletin seeks to serve.

KEH, AGH.

TERMS OF REFERENCE OF THE INTERNATIONAL COMMISSION ON MATHEMATICAL INSTRUCTION

(Accepted in August, 1982 by the General Assembly of IMU)

- (a) The Commission shall consist of
 - (1) the members of an Executive Committee as specified in (b) below, elected by IMU, and
 - (2) one national delegate from each member nation as specified in (d) below,
- (b) The Executive Committee consists of four officers, namely, President, two Vice Presidents, and Secretary, and of three further members. Furthermore, the outgoing President of ICMI, the President and the Secretary of IMU, and the representative of IMU at CTS (ICSU) are members ex-officio of the E.C.
- (c) In all other respects the Commission shall make its own decisions as to its internal organization and rules of procedure.
- (d) Any National Adhering Organization wishing to support or encourage the work of the Commission may create, or recognize, in agreement with its National Committee, a National Sub-Commission for ICMI to maintain liaison with the Commission in all matters pertinent to its affairs. The National Adhering Organization in question shall designate one member of the said Sub-Commission, if created, to serve as a delegated member of ICMI as mentioned in (a).
- (e) The Commission shall be charged with the conduct of the activities of IMU, bearing on mathematical or scientific education and shall take the initiative in inaugurating appropriate programmes designed to further the sound development of mathematical education at all levels, and to secure public appreciation of its importance. In the pursuit of this objective, the Commission shall cooperate, to the extent it considers desirable with effective regional groups which may be formed spontaneously, within, or outside, its own structure.
- (f) The Commission may, with the approval of the Executive Committee of IMU, coopt, as members of ICMI, suitably chosen representatives of non-IMU countries, on an individual basis.
- (g) The budget of the Commission shall be submitted to the Executive Committee of IMU and the General Assembly, for approval, at such times as may be determined by agreement between the Commission and the Executive Committee of IMU.
- (h) The Commission shall file an annual report of its activities with the Executive Committee of IMU, and shall file a quadrennial report at each regular meeting of the General Assembly.

INTERNATIONAL COMMISSION ON MATHEMATICAL INSTRUCTION

I. C. M. I.

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1983-1986

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	J. MOSER	President of IMU Eidgenossische Technische Hochschule (E.T.H.) E.T.H. Centrum - Mathematics CH-8092 ZURICH SWITZERLAND
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JAPAN	Professor Shigeru Mizohata, Department of Mathematics, Kyoto University, Sakyo-ku, Kyoto 606, JAPAN.
LUXEMBOURG	Professor L. Kieffer, 1 Rue Jean Jaurès, 1836 LUXEMBOURG.
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YUGOSLAVIA	Dr. Milica Ilić-Dajović, Gospodar Jevremova 45, 11000 Beograd, YUGOSLAVIA.
ZAMBIA	Dr. S.M. Bayat, Secretary, Mathematical Association of Zambia, P.O. Box RW204, Ridgeway, Lusaka, ZAMBIA.

ICMI FINANCES

1. Financial statement from the retiring Secretary

Balance at 26 April 1982	\$ 4587.10
Expenses of Professor Nebres to attend IPC Core Committee meeting	400.00
Expenses of Professor Christiansen and Dr. Howson to meet with Professor Kahane in Paris	460.00
Incidental expenses	26.36
Balance at 31 December 1982	<u>\$ 3700.74</u>

P.J. Hilton

2. ICMI Bank Accounts

The ICMI accounts are held at the Southampton University Branch of Barclays Bank (20-79-32). The account numbers are

Sterling	current : 90514500
Dollar	current : 34112967
Dollar	deposit : 38662716

ICME 5 : ADELAIDE, 1984

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

The programme for the Congress is being planned by an International Programme Committee comprising U. D'Ambrosio* (Brazil), M.S. Arora (India), J.P. Baxter* (Australia), M. Carss* (Australia), E. Castelnuovo (Italy), B. Christiansen* (Denmark), S. Erlwanger (Canada), V.V. Firsov (USSR), T.J. Fletcher (UK), M. Glaymann (France), H.B. Griffiths (UK), P. Hilton (USA), H. Hogbe-Nlend (Cameroon), E. Jacobsen (UNESCO), Y. Kawada (Japan), T. Kawaguchi* (Japan), Lee P.Y. (Singapore), J.M. Mack* (Australia), B. Malgrange (France), B.F. Nebres* (Philippines), B.H. Neumann (Australia), M.F. Newman* (Chairman) (Australia), B. Penkov (Bulgaria), H.O. Pollak* (USA), E. Lluís Riera (Mexico), Z. Semadeni (Poland), S.R. Sinha (India), H-G Steiner (F.R.G.), S.A. Teljakovskii (USSR), M.E.A. El Tom* (Sudan), V. Treilibs (Australia), D. Wheeler (Canada), H. Whitney (USA), E. Wittmann (F.R.G.). (* indicates a member of the Core Committee).

The aim has been to design a programme which will foster active international cooperation. To this end, the time available has been divided into sessions in the following way.

Plenary sessions will be held on Friday, August 24, Monday, August 27, and Thursday, August 30. The programmes on the Saturday, Sunday, Tuesday and Wednesday will each contain five sessions separated by breaks for refreshment or meals. In order to provide both a variety of types of presentations and a range of levels of involvement of participants, the working sessions have been allocated in the following ways:

Session 1. (0830 - 1000 each day)

The four sessions will be devoted to seven simultaneous groups each dealing with the problems of a particular population, namely:

- early childhood years (ages 4-8)
- elementary school (ages 7-12)
- junior secondary school (ages 11-16)
- senior secondary school (ages 15-19)
- tertiary (post-secondary) academic institutions (18+)
- pre-service teacher education
- adult, technical and vocational education.

Session 3. (1400 - 1530 each day)

Again, the four sessions will be devoted to seven simultaneous groups, each this time dealing with a particular theme, namely:

Mathematics For All
The Professional Life of Teachers
Technology
Problem Solving and Involvement Activities
Curriculum Development
Applications and Modelling
Theory, Research and Practice in Mathematics Education.

Sessions 2 and 4 will be concerned with informative presentations on specific topics in mathematics education and related areas, poster sessions, project presentations, meetings of special groups, etc.

There will be social events on the Friday and Saturday evenings (Session 5) and film, video, computer and other presentations will be offered on other evenings. The General Assembly of ICMI will be held on Wednesday evening, August 29.

Established study groups and working parties will be invited to arrange pre- or post-Congress meetings. There will be a commercial display of equipment and materials. Excursions are planned for the Monday afternoon.

The following have been appointed to organise the various 'action', 'theme' and 'area' groups:

Action Groups

Mathematics education relevant to

1. Early childhood years (ages 4 - 8)

Professor E. Glenadine GIBB
Dept. of Curriculum and Instruction
College of Education EDB 406
The University of Texas at Austin
Austin, Texas 78712-1294
USA

Professor Doyal NELSON
Faculty of Education
University of Alberta
Edmonton, Alberta
Canada

2. Elementary school (ages 7 - 12)

Dr. Claude COMITI
IMAC
BP 53
38041 Grenoble Cédex
France

Professor Joseph N. PAYNE
School of Education
The University of Michigan
Ann Arbor, Michigan 48109
USA

3. Junior secondary school (ages 11 - 16)

Professor F. Joe CROSSWHITE
Science and Mathematics Education
The Ohio State University
283 Arps Hall
1945 North High Street
Columbus, Ohio 43210
USA

4. Senior secondary school (ages 15 - 19)

Mr. John C. EGSGARD
(till 1983 August 30)
1 Chemin de la Milière
1234 Vessy - GE
Switzerland

Dr. Trevor J. FLETCHER
Department of Education and Science
Mowden Hall
Staindrop Road
Darlington DL3 9BG
England

5. Tertiary (post-secondary) academic institutions (18+)

Professor H. Brian GRIFFITHS
Faculty of Mathematical Studies
The University
Southampton SO9 5NH
England

Professor J.H. van LINT
Department of Mathematics
California Institute of
Technology
Pasadena, California 91125
USA

6. Pre-service teacher education

Professor Willi DÖRFLER
Institut für Mathematik
Universitätsstrasse 55-67
A-9010 Klagenfurt
Austria

Professor Claude GAULIN
Faculté des Sciences de l'Éducation
Université Laval
Cité Universitaire
Québec G1K 7P4
Canada

Miss H.B. SHUARD
Homerton College
Cambridge CB2 2PH
England

7. Adult, technical and vocational education

Professor Suzanne K. DAMARIN
Early and Middle Childhood
Education
The Ohio State University
1945 North High Street
Columbus, Ohio 43210
USA

Dr. Rudolf STRAESSER
Institut für Didaktik der
Mathematik
Universität Bielefeld
Postfach 8640
4800 Bielefeld 1
F.R. Germany (GDR)

Theme Groups

1. Mathematics for all

Dr. Peter DAMEROW
Max-Planck-Institut
Lentzeallee 94
1 Berlin 33 - Dahlem
F.R. Germany

Professor B.F. NEBRES
Ateneo de Manila University
Box 154 Manila
Philippines

2. The professional life of teachers

Professor Tom COONEY
105 Aderhold Hall
University of Georgia
Athens, GA 30602
U.S.A.

Dr. F. GOFFREE
Stichting voor de
Leerplanontwikkeling
Postbus 2041
7500 CA Enschede
Netherlands

3. Technology

Mrs. Rosemary E. FRASER
College of St. Mark and
St. John
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Plymouth PL6 8BH
England

Professor Hartwig MEISSNER
Universität Münster
Fliehdnerstr 21
D-4400 Münster
F.R. Germany

Professor Anthony RALSTON
Department of Computer Science
SUNY at Buffalo
4226 Ridge Lea Road
Amherst, NY 14226
USA

4. Theory, research and practice in mathematics education

Dr. Alan BELL
The Shell Centre
The University of Nottingham
Nottingham NG7 2RD
England

Professor E. FISCHBEIN
c/o Professor A. Abele
Schlittweg 33
D 6905 Schriesheim
F.R. Germany

Professor Jeremy KILPATRICK
105 Aderhold Hall
University of Georgia
Athens GA 30602
USA

5. Curriculum development

Professor Jean DHOMBRES
Université de Nantes
Institut de Mathématiques
BP 1044
44072 Nantes Cédex
France

Dr. A.G. HOWSON
Faculty of Mathematical Studies
The University
Southampton SO9 5NH
England

6. Applications and modelling

Professor Mogens NISS
IMFUPA
Roskilde Universitetscenter
Post Box 260
DK-4000 Roskilde
Denmark

Professor Richard LESH
Northwestern University
School of Education
2003 Sheridan Road
Evanston, Ill 60201
U.S.A.

7. Problem solving and involvement activities

Professor Hugh BURKHARDT
The Shell Centre
The University of Nottingham
Nottingham NG7 2RD
England

Professor Alan SCHOENFELD
Graduate School of Education
University of Rochester
Rochester NY 14627
USA

Areas

1. Evaluation

Professor Kenneth J. TRAVERS
341 Armory
University of Illinois
Champaign, Illinois 61820
USA

2. Theory of mathematics education

Professor Dr. H.G. STEINER
Institut für Didaktik der Mathematik
Universität Bielefeld
Postfach 8640
4800 Bielefeld 1
F.R. Germany

The address of Dr. M.F. Newman, Chairman of the International Program Committee is Department of Mathematics, Australian National University, P.O. Box 4, Canberra, ACT 2600, Australia and that of Mrs. Marjorie Carss, Chairwoman of the National Program Committee, is Department of Education, University of Queensland, St. Lucia, Brisbane, Queensland 4067, Australia.

WARSAW SYMPOSIUM, 1983

The symposium arranged to coincide with the ICM planned to take place in August, 1982 will, like the ICM itself, now be held in August 1983.

The dates of the ICM are 16-24 August and of the ICMI Symposium 16-19 August. The theme of the symposium is 'What should be the goals and content of general mathematical education?' The symposium will be chaired by Professor H-G Steiner, IDM, Postfach 8640, D 4800 Bielefeld 1, Federal Republic of Germany, and Professor A.Z. Krygowska, ul. Oleandry 6m. 6, Krakow, Poland.

National Representatives who intend to attend the ICM are asked to inform Dr. Howson so that an informal meeting can be arranged should numbers warrant it.

ICMI - JSME REGIONAL CONFERENCE ON MATHEMATICAL EDUCATION

This conference, organised by the Japan Society of Mathematical Education and ICMI, in connection with UNESCO, the National Institute for Educational Research of Japan and the Mathematical Society of Japan, will be held in Tokyo from October 10 to 14, 1983.

The general theme is 'School Mathematics in and for changing societies' and particular problems to be explored are the increase in mathematical competence required of today's citizens, new fields of application of mathematics, developments in technology affecting the content and methods of mathematics curricula, and the 'student explosion' to be found in many countries.

The working languages of the conference are English and Japanese.

There will be some plenary lectures but much of the meeting will be devoted to working group sessions.

The Secretary of the Conference, from whom further details can be obtained, is Mr. T. Sawada, ICMI-JSME Conference, National Institute for Educational Research, 5-22 Shimomeguro 6-chome, Meguro-ku, Tokyo 153, Japan.

SEAMS

Professor V. Boonyasombat, Department of Mathematics, Chulalongkorn University, Bangkok 10500, THAILAND has succeeded Professor Lee Peng Yee as President of the Southeast Asian Mathematical Society. Preliminary plans have been made for the Third Southeast Asian Conference on Mathematical Education to be held in Thailand during the last week of May, 1984. The Conference Secretary is Dr. S. Nualtaranee of Chulalongkorn University.

COOPERATION BETWEEN SCIENCE TEACHERS AND MATHEMATICS TEACHERS

The Committee on the Teaching of Science of the International Council of Scientific Unions (ICSU-CTS) has recently published a series of booklets intended to promote cooperation between science teachers and their mathematics colleagues. The series arose out of a conference held at Bielefeld in 1978 which brought together teachers of mathematics and teachers of the various sciences at a variety of levels. Before mentioning some details about the booklets, further information should perhaps be given about the origins of the Bielefeld Conference.

During the Second International Congress on Mathematical Education (Exeter, 1972), recommendations were made on providing support for cooperation between mathematics teachers and science teachers. Subsequent discussions in the ICMI Executive Committee made it evident that a programme should be initiated which could bring together specialists from mathematics and science education. To this end discussions took place in 1975 between the then President of ICMI, Sir James Lighthill, and members of the Committee on the Teaching of Science (CTS), including the later Chairman of CTS, Professor Charles Taylor. Based upon these talks developments took place which resulted in an international project co-sponsored by Unesco, CTS, ICPE (the International Commission on Physics Education) and ICMI. In October 1976, at a meeting in Paris, a Steering Committee for the project "cooperation between science teachers and mathematics teachers" was set up.

The first result of the work of this project was the Bielefeld Conference, September 17-23, 1978. This conference was sponsored also by the Institute for the Didactics of Mathematics (IDM), which played a major role in the organization of the programme.

The Bielefeld Conference brought together about 60 specialists from 16 countries. The proceedings of the conference, Cooperation between science teachers and mathematics teachers, were published in 1979 by: Institut für Didaktik der Mathematik, Postfach 8640, D - 4800 Bielefeld 1, Federal Republic of Germany. The report includes the plenary papers as well as further papers and contributions prepared for the conference.

Whereas the conference dealt largely with the theoretical background for cooperation, the booklets produced by the project are intended to assist teachers to cooperate at a school level. The development of these materials has been supervised by an Editorial Board: C.A. Taylor (UK), Sir James Lighthill (UK), Bent Christiansen (Denmark), H.-G. Steiner (F.R.G.), Ed Jacobsen (Unesco) and W. Dierks (F.R.G.).

The series is edited by Alan Rogerson on behalf of ICSU-CTS and ICMI, and its publication was made possible by financial assistance received from Unesco. The first six titles are as follows:

1. Functions and Physics
2. Links between Geography and Mathematics
3. Our Inheritance: Common Ground for the Mathematics and Biology Teacher
4. Mathematics and Chemistry
5. Mathematical Modelling
6. Mathematical Modelling with Calculus

The books can be ordered from: The Publications Officer, The Association for Science Education, College Lane, Hatfield, Hertfordshire, U.K. Only full sets are available, and the cost per set is £5.00 or US \$12 (by surface mail).

Bent Christiansen

THE SIXTH INTERAMERICAN CONFERENCE ON MATHEMATICS EDUCATION

This conference will take place in Mexico, towards the end of November, 1983. The chairman of the organizing committee is Professor Emilio R. Lluis, Instituto de Matematica, UNAM-Circuito Exterior, Ciudad Universitaria, Mexico 18, DF Mexico.

PME

The International Group for the Psychology of Mathematics Education, known as PME, was formally brought into existence at the Third International Congress on Mathematical Education held in Karlsruhe, West Germany in 1976 and, at that time, became one of the groups affiliated to ICMI.

The major aims of PME are

- (1) to promote international contacts and the exchange of scientific information in the psychology of mathematics education;
- (2) to promote and stimulate appropriate interdisciplinary research with the co-operation of psychologists, mathematicians and mathematics teachers;
- (3) to increase understanding of the psychological aspects of learning and teaching mathematics and of their implications.

PME's current membership of approximately 500 is to be found in fairly equal proportions in Europe and North America. However, there are members in Japan, India, Mexico and New Guinea, and membership is growing in Israel and Australia. Members keep in touch through a Newsletter which is distributed twice yearly. However, the major activity of PME is the annual Conference. The first of these was held in Utrecht, Holland in 1977. Since then, conferences have been held in Osnabrück, W. Germany (PME II), Warwick, U.K. (PME III), Berkeley, U.S.A., coinciding with ICME IV (PME IV), Grenoble, France (PME V) and Antwerp, Belgium (PME VI). The seventh PME will be held in Jerusalem, Israel, from July 24 - July 29, 1983 and the eighth in Australia to coincide with ICME5 in 1984.

Annual conferences provide an opportunity for members, and local teachers and researchers, to exchange information and results. Conference proceedings are published in book form and can be obtained from either of PME's distribution centres:

Shell Centre for
Mathematical Education
University of Nottingham
University Park
Nottingham NG7 2RD U.K.

Wisconsin Center for
Educational Research
University of Wisconsin
1025 W. Johnson Street
Madison, Wisconsin 53706 U.S.A.

Requests for the second announcement of the VIIth PME Conference to

be held in Israel this year should be sent to Rina Hershkowitz, Department of Science Teaching, The Weizmann Institute of Science, 76100 Rehovot, Israel (cable address WEIZINST/HERSHKOWITZ, Telex 31900 IL).

The current officers of PME are:

- President: Gerard Vergnaud, Maison des Sciences Humaines, Psycho., 54 Boulevard Raspail, 75270 Paris, France.
- Vice-Pres: Jim Moser, Wisconsin Research and Development Center, Madison, Wisconsin 53706, U.S.A.
- Secretary: Leone Burton, Avery Hill College, Bexley Road, Eltham, London SE9 2PQ, U.K.
- Treasurer: Hartwig Meissner, Westfälische Wilhelms Universität, D-4400 Münster, W. Germany.

any one of whom would be delighted to respond to enquiries for more information.

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INTERNATIONAL MATHEMATICAL OLYMPIADS

The 1982 International Mathematical Olympiad (IMO) was held in Budapest, Hungary in July. Teams of school pupils from 30 countries participated, 3 more countries than in 1981, the previous highest total. ((Although the IMO is an individual competition, it is interesting to record that the team from the Federal Republic of Germany scored the highest total of points, 145 (out of a maximum of 168), the Soviet Union 137 points, while both the German Democratic Republic and the United States of America scored 136 points.))

A pleasing feature of recent IMOs has been the increasing number of countries from all over the world that are taking part. However, this increase poses problems for the host country. Apart from the increased costs that are inevitable, the time required for the 'coordination' of the competitors' solutions to ensure that fair and uniform standards are applied in awarding points also increases. In response to these problems Hungary invited smaller teams than has been the custom in the past and duplicate coordination committees were used.

The 1983 IMO will be held in July in Paris, France.

The IMO Site Committee was established in 1981 with the following membership: B.H. Neumann (Chairman, Australia); J.W. Hersee (Secretary, England); H.L. Alder (USA); J.van de Craats (Netherlands); E. Hódi (Hungary); A. Makowski (Poland). I. Cuculescu joined the Committee in 1982. The Site Committee is not a decision-making body. Its sole purpose is to ensure that regular, annual IMOs are held and to assist host countries. On the basis of information currently available to the Site Committee it seems safe to assume that there will be countries prepared to act as hosts in the next few years, thus avoiding a repetition of the hiatus of 1980, when no IMO was held.

Although the Site Committee is associated with ICMI, the Commission has no responsibility for financing and organising the Olympiads. The host country, which meets all expenses of the IMO (apart from travelling costs of the teams), issues invitations and decides the dates, duration and style of the competition, although the general pattern is now well established. Participating countries are invited to submit possible problems for the competition. The Leaders of the teams form the International Jury which selects 6 problems, to be taken in two sets of three, on each of two successive days. During the remainder of the time - about a week or ten days in all - the teams are entertained by the host country while the Jury deals with the students' scripts. Each Leader marks the work of his own team, but for each question a team of coordinators ensures that consistent standards are applied. The coordinators also take note of outstanding work which may be recognised by the award of a special prize. First, second and third prizes are awarded on the basis of the points scored by students; it is customary for about half of the competitors to receive prizes.

Newsletters containing information about the IMOs are distributed by the Secretary of the Site Committee (SMP, Westfield College, Kidderpore Avenue, London NW3 7ST, England).

INTERNATIONAL COLLOQUIUM ON GEOMETRY TEACHING

Some ninety people coming mainly from western Europe attended a meeting organised by ICMI Belgian sub-commission at Mons University from 30 August to 2 September, 1982. More than 30 contributions were presented including those by F. Buekenhout (Brussels), G. Papy (Brussels), A. Bishop (Cambridge), J. de Lange (Utrecht), E. Castelnuovo (Roma), R. Stowasser (Berlin) and H. Freudenthal (Utrecht).

The first impression after this meeting is that geometry is making a come-back. After about twenty years, during which it was out of fashion, the necessity of a good course on geometry appears to be widely recognised. However, many questions remain open. Probably exactly those that were responsible for the emphasis on other subjects for such a long time. In particular, the objectives of geometry teaching are not quite clear, or at least there does not exist a general agreement about them.

That is an uncomfortable situation. But it is also a source of richness and diversity. And indeed, viewpoints are varied. We should mention two trends. The first is towards a more intuitive geometry. In many countries, during the "new math" period, geometry was either reduced to linear algebra or completely reconstructed from the start in a formal and deductive manner. In each case, the theory thus elaborated was often a very fine mathematical theory, but with major deficiencies: it was not adapted to children and lacked any intuitive content. This explains the present tendency to present to children geometry courses based on activities rather than on lectures. Also to confront them with pedagogical situations giving rise to mathematical explorations and problem solving. By problem solving, I mean here studying and answering questions for which the way of proceeding is not immediately clear. In this connection - i.e. developing geometric intuition and activities - I should also mention the growing use of technological aids such as films and above all micro-computers.

The other trend I was referring to is not to throw the baby out with the bath water. This means keeping from the "new math" period the ideas that have proved fruitful. Structured sets and transformations remain the main objects of any mathematical study. And mathematizing concrete situations necessarily involves dealing with structured sets and their groups of automorphisms. This can't be forgotten.

It is of course very difficult to summarize in a few words the content of so many and such diverse contributions. So to conclude, I want to announce that the proceedings of the colloquium (360 pages) will be available at the end of January. They can be purchased by paying 250 FB if sent by surface mail or 300 FB for air mail postage to the "CREDIT COMMUNAL DE BELGIQUE", account nr 068-0563410-61, for "ICMI-BELGIUM", 14bis rue des fontaines, B7460 Casteau, Belgium.

G. NOEL

JOURNALS ON MATHEMATICS EDUCATION

1. EDUCATIONAL STUDIES IN MATHEMATICS

ESM was first published in May 1968 and was the brainchild of Professor Hans Freudenthal of the University of Utrecht in the Netherlands. During the exciting developments of the sixties there had been a growing realisation of the necessity to improve the facilities for international cooperation and the sharing of ideas concerning mathematics teaching, and Professor Freudenthal was able to persuade D. Reidel's publishing company to launch a high level journal which could act as an important forum for this cooperation. The fact that it has survived, prospered and is highly respected is a tribute to Professor Freudenthal's courage and energy.

The first issue contained the proceedings of the colloquium "How to teach mathematics so as to be useful" held in Utrecht in 1967, and from time to time proceedings of other meetings have been included in the journal. For example, the addresses of the first International Congress on Mathematical Education (December 1969), the lectures of the Comprehensive School Mathematics Project's conference on the Teaching of Geometry (June 1971) and the special issue of Invited Papers given on the occasion of Freudenthal's retirement from IOWO, the highly influential Dutch curriculum development group (July 1976). Other special issues have included "Five Years IOWO" about the work of that group (August 1976) and two issues devoted to the theme "Changes in Mathematics Education since the late 1950's - ideas and realisation" (May 1978) with contributions representing some 16 countries.

However, the main concern of the editors has been to publish "high-level articles of more than local or national interest" and a glance at the contents lists shows the rich variety of concerns in the field of mathematics education. One can perhaps detect a shift of emphasis from the curriculum concerns of the early seventies as represented by some of the conference proceedings, to the more psychologically-based research interests of the late seventies represented by articles with titles such as "Bilinguals' understanding of logical connectives", "Experiments in teaching intuitive topology", "The development of proportional reasoning" and "Sex differences in mathematical performance: an historical perspective". However, as well as reflecting changes in the concerns of mathematics education one can, through the journal, detect the growth of the study of mathematics education itself. This is shown in the present trend towards more social and societal aspects, with articles like "Changing mathematics education in

Mozambique" by Gerdes (November 1981), "Socialist Mathematics Education, does it exist?" by Howson (August 1980), "Instrumentalism as an educational concept" by Mellin-Olsen (August 1981), "Hidden dimensions in the so-called reality of the mathematics classroom" by Bauersfeld (February 1980) and "Bright girls, mathematics and fear of success" by Leder (November 1980).

The journal has a reviewing policy, whereby every manuscript is reviewed by at least two members of the international editorial board, which at present is 20 strong and represents all continents. Furthermore, because we publish articles in either English or French, one of the reviewers of any manuscript is a natural speaker of that language while generally the other is not. Occasionally articles are solicited from specific researchers but in the main the journal reflects what authors wish it to reflect, while the reviewers attend to the quality of the research, and of the reporting. There is also a book review section which offers both short reviews and full-length review articles, and the journal accepts and publishes notices of conferences and meetings considered to be of particular interest to the international mathematics education community.

Intending authors are advised to consult a recent issue of the journal, if possible, before submitting manuscripts to the editor (at the address below) because the inside back cover always contains the information on manuscript preparation. Books for review should be sent to the Book Review editor, while advertising and subscription requests go to the publishers. The current subscription rate for an annual volume of four issues is Dfl.66/\$26.50 for individuals and Dfl.180/\$72 for institutions.

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THE NATIONAL SCIENCE BOARD COMMISSION ON PRECOLLEGE EDUCATION IN MATHEMATICS, SCIENCE AND TECHNOLOGY

In response to the current decline in the quality and quantity of precollege mathematics and science education in the United States, the National Science Board (NSB) established the Commission on Precollege Education in Mathematics, Science and Technology. The NSB Commission is composed of 20 persons from a wide variety of fields and is co-chaired by William T. Coleman, Jr. and Cecily Cannan Selby.

The purpose of the NSB Commission is to define a national agenda for improving mathematics and science education in the USA. It will develop an action plan that will include a definition of the appropriate roles and responsibilities of federal, state, and local governments, professional and scientific societies, and the private sector in addressing this problem of national dimension.

The Commission will be active over a period of 18 months and will issue interim reports on its findings. The Commission is charged to:

- Examine the existing evidence on the quality of precollege (all classes, K-12) education in mathematics and science;
- Identify where current practices and policies fail to ensure the entry, selection, education and utilization of the full range of potential talent in science, mathematics and engineering;
- Identify and analyze existing mathematics and science programs, teaching materials and teaching techniques whose success may justify imitation or adaptation;
- Develop an understanding of the roles that all systems - government and private organizations, professional groups and individuals - can play in improving mathematics and science education;
- Establish a set of principles, options and strategies which can be used to improve the quality of secondary school science and mathematics education.

THE ANGLO-SOVIET SEMINARS ON MATHEMATICAL EDUCATION

Two successful seminars have recently taken place between 'teams' of mathematics educators from the USSR and England, and we believe that the existence, organisation and outcomes of the two meetings will be of interest to many mathematics educators in other countries. The Proceedings of the first seminar are available on request from The British Council, Education, Medicine and Science Division, 10 Spring Gardens, London, SW1A 2BN, England.

The following account of the 1982 seminar is written by Dr. V.M. Monakhov, Director of the Scientific Research Institute of Methods and Contents of Education, USSR Academy of Pedagogical Sciences. This second meeting was sponsored by Dr. Monakhov's institute.

In accordance with the agreement between the USSR and Great Britain on scientific and cultural cooperation a Soviet-British seminar on mathematical education was held in Oxford in September, 1981. This first meeting of Soviet and British scientists was effective and produced considerable scientific results. The Ministry of Education of the USSR suggested that a second seminar should be held in Moscow in 1982, and that its programme should be based on suggestions and wishes expressed in Oxford. This Second Soviet-British Seminar on Mathematical Education took place in Moscow from September 20th - 30th, 1982. V.M. Monakhov conducted the seminar and headed the Soviet delegation which comprised prominent Soviet mathematicians and specialists in methods of teaching.

The main topics considered at the seminar were:

- the systems of mathematical education in the USSR and England and the problems in this field in both countries;
- the aims of mathematical instruction and planning the outcomes of teaching mathematics;
- the contents of education and corresponding problems in methods of teaching;
- the structure and contents of mathematics teacher training.

A lively and heated discussion proved valuable for both sides. In particular, useful information was gained on school mathematical projects in Great Britain. The aims of mathematical education were discussed comprehensively and in a principled manner. The seminar materials will promote considerable progress in the field of concretisation of the aims of mathematical education and the planning of its results. A critique of the general aims of teaching mathematics and a classification of possible planned outcomes of mathematical teaching based on a relatively exact differentiation between the desired outcomes for the individual and the desired outcomes for the society suggested by the British side was of

considerable interest. It was noteworthy that the analysis of this classification showed that both groups in fact described the same aims but used different terminology.

The seminar was instrumental in throwing light on the positive experience of the Soviet education system and the main directions in the field of mathematics teaching improvement. The papers of many Soviet delegates were of great interest to their British colleagues, as was shown by the numerous questions and the lively discussions, as well as by the way in which remarks made by the British delegates indicated their high evaluation of many of the Soviet contributions. Especial interest was shown in the basic and typical features of the Soviet system of mathematical education, namely, its functioning in a centralised way and on a common basis.

An outline of the main problems concerned with methods of teaching encountered in the Soviet system of popular education as a result of the transition to the implementation of general and compulsory secondary education was given in V.M. Monakhov's paper, "The methods and problems of the implementation of general secondary education". It was shown that the key problem in the course of implementing general secondary education is the identification of a core of general education and its recording in standard documents on methods of teaching, that would set the minimum training standards necessary for the future career and education of every young person and which could be guaranteed by the State.

The paper describes the apparatus adopted for solving these problems - the basic and fundamental syllabi in the school subjects. The resulting problems of teaching methods were tackled through the adjustment of textbooks and the provision of guidebooks for teachers attuned to the basic syllabi. These demands also necessitated the re-orientation of the process of training and differentiation of requirements in order to suit pupils of different abilities.

Our British colleagues expressed a great interest in the ways and means used to achieve the realisation of general secondary education, the problems of, and methods employed for, compiling curricula and textbooks, and the contents of secondary mathematical education in the USSR. They received detailed and full answers to these problems in the course of listening to and discussing the papers read by V.M. Monakhov, V.V. Firsov, A.A. Gonchar, A.V. Pogorelov, Y.N. Makaritchev, K.I. Neshkov, R.S. Tcherkasov, G.V. Dorofeev, N.J. Vilenkin, N.E. Shkil and L.V. Kuznetsova.

V.M. Monakhov

