

ICMI

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of the
International Commission
on
Mathematical Instruction

No. 29

DECEMBER 1990

Secretariat
Centre for Mathematics Education
University of Southampton
Southampton, SO9 5NH
England



The International Commission on Mathematical Instruction

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Editors: Keith Hirst and Geoffrey Howson
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University of Southampton
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A FAREWELL MESSAGE FROM

JEAN-PIERRE KAHANE

THE RETIRING PRESIDENT OF ICMI

To have been president of ICMI for eight years is a very rewarding experience. First, because of the colleagues whom I met and worked with, A.G. Howson in the first place. And also through the questions we had to consider and the corresponding enlargement of my own views on mathematics, teaching and society.

Instead of a report on ICMI activities - which you can find on looking back at a collection of bulletins - let me relate part of this experience and these views, which may be of some interest for the readers of this bulletin.

In 1982 Lennart Carleson, President of IMU, the International Mathematical Union, and Hassler Whitney, President of ICMI, asked me to consider taking the presidency of ICMI. At the time I really knew very little of ICMI. I had read some papers in *l'Enseignement Mathématique* when ICMI (then *Commission Internationale de l'Enseignement Mathématique*) was created, with Felix Klein as president and Henri Fehr as secretary - by the way, the papers published by or around the CIEM during the period 1905-1914 are fascinating. And I had been active in establishing the French subcommission of ICMI (SCFCIEM) a few years earlier. That is all. I accepted the idea because of my general interest in mathematical education and because I felt that something could be done at an international level.

Then I was elected together with the new Executive Committee, by the General Assembly of IMU. I remember very clearly the working meeting which we had in Orsay at the end of 1982, Bent Christiansen, then vice-president, Geoffrey Howson, Ed Jacobsen from UNESCO and myself. We discussed very freely and made no report. However we actually planned ICMI's activities for several years. First, the principle of ICMI studies on topics of current interest at an international level, with the aim of producing useful *mises-au-point*, without giving any ICMI-labelled solution to any educational problem. Second, possible topics: the influence of computers and informatics on mathematics and its teaching, school mathematics in the 1990, mathematics and cognition, and mathematics as a service subject. In the third place we discussed the organization of the fifth ICME, International Congress on Mathematical Education, to be held in Adelaide, Australia; more exactly, Bent explained to me how the congress was prepared, the roles of the planning committee and the core committee, the people involved, what was good and not so good. We discussed financial matters, regional conferences, affiliated groups, international mathematical olympiads, the structure of ICMI (executive committee and national representatives) and we finally decided

that I should write a letter to the national representatives on January 1, 1983, the official date when we had to function, to ask them for cooperation.

Looking back over the past eight years and comparing what we had in mind originally and what happened, I am not dissatisfied. We have had five studies (the last: Popularization of mathematics), another is running (Assessment), another is being prepared (on sex aspects), many more are in prospect (mathematics in the training of elementary school teachers; how to bring more young people into mathematics; the teaching of geometry; the teaching of probability; algebra and computers; mathematics and TV; and video; and radio...). The scheme of the first study was typical: a program committee elected by the Executive Committee of ICMI, a discussion document published in the ICMI bulletin and in *l'Enseignement Mathématique*, responses, invitations, a restricted international symposium, Proceedings in the ICMI study series. We were happy that both the discussion document and the Proceedings were translated into several languages and followed by regional meetings and actions at different levels. A new version of the book is being prepared now by a team led by Bernard Cornu and Tony Ralston and will be published by UNESCO. Similar comments apply to the other studies.

We had two ICMEs, in Adelaide and Budapest, and ICME 7 is in preparation in Quebec. A decision on the location of ICME 8 will be taken by the EC just elected. The attendances are increasing and we have a good idea of their impact through the reactions of participants from different countries. The Proceedings of ICME 6 appeared in a *temps-record*.

We had three ICM's (International Congress of Mathematicians) with ICMI sessions. In Kyoto the ICMI sessions were part of the general program. They will be published by *l'Enseignement Mathématique*.

There was a number of regional conferences in all continents, the last one of a new type (Ibero-america in Seville); the next one is in China. There were meetings of the affiliated groups and participation in general ICMI activities. There were actions in common with ICSU (the International Council of Scientific Unions) and UNESCO. There was a small but useful involvement of ICMI in Olympiads, and new attention was paid to mathematical competitions. Studies, congresses, conferences and other actions enlarged the field of ICMI's interests and impact.

Activities depend on people. One cannot imagine ICME 5 without Marjorie Carss, even less ICME 6 without Tibor Nemetz. One man played a crucial role in all ICMI's activities: A.G. Howson. Working with him was not only pleasant and easy. What I consider now as my personal views are a result of our common work for a good part.

Let me recall the executive committee of both periods 1982-86 and 1986-90. Olli Lehto was an ex-officio member as secretary of IMU. Cooperation with him was essential for ICMI, and he helped us in a constant way. From the first period I have already mentioned Bent

Christiansen. Zbigniew Semadeni was the other vice-president, and he had the significant task of organizing the symposium *Mathematics for all*, held during the 1983 ICM in Warsaw. Mike Newman was the head of the planning committee of the Adelaide Congress ICME 5. Henry Pollak played a decisive role in the Computer study (as, later on, in the Service and Popularization studies), and Ben Nebres in the School study and in our reflection on Third-world problems. In the second period the EC was renewed completely apart from Olli Lehto, Geoffrey Howson and myself. Emilio Lluís and Lee Peng Yee were vice-presidents and their election initiated a series of moves towards the Spanish-speaking world and towards Eastern Asia, including China. This aspect, together with the planning of the ICMI sessions in the program of the Kyoto ICM, was also in the field of Hiroshi Fujita; an intimate relation with Japan is a precious tradition of ICMI. Mogens Niss and Jeremy Kilpatrick insured a strong linkage with mathematical educators in Europe and North America. Jack van Lint entered the EC as the representative of IMU in the ICSU-CTS, the Committee of Teaching of Science in ICSU, and was very active in the studies, in particular the "Service" study which was held in cooperation with the ICSU-CTS. I am happy that Jack van Lint, Jeremy Kilpatrick, Mogens Niss and Lee Peng Yee are staying in the newly elected ICMI-EC. These many colleagues of both EC's had different views and ideas, and to be able to work with them was a privilege for me.

However I am not completely satisfied with the past, and there are many questions to be attacked in the future.

First, ICMI as a body does not work properly. For financial reasons each EC met only twice. Much of the work was done by correspondence. Though the EC members were committed in many actions personally, there was not a sufficiently intimate relation between them. However, our weakest point is not there. ICMI as a whole consists of the EC and the National Representatives. Who are the National Representatives? How do they react to this Bulletin? Do they pass on the information? What is their relation to mathematics education in their countries? There are many of whom we do not know whether they are living or dead. There is only one General Assembly every four years: not everyone is there and time is short for real debate. How can we improve the preparation and effect of this General Assembly? How can we ensure a fruitful *aller-retour* between the National Representatives and the EC? One step has been taken already: at the suggestion of the ICMI EC, the General Assembly of IMU passed a resolution that each adhering organization should regularly elect a National Representative and that, as a matter of principle, no one should normally serve for more than two, four-year terms of office. Now steps must be taken within ICMI and at the national level. The best structure is a national sub-commission of ICMI in which all interested bodies and communities are represented - scientific and professional associations, official bodies, mathematicians, mathematics educators, mathematics teachers. The National Representative should be elected in that structure and should ensure good communication between ICMI and the national sub-commission.

Now, why is ICMI a commission of IMU and not an independent organization? There are historical and formal reasons. The majority of our financial support comes from IMU, and from ICSU *via* IMU. However, in my opinion, the fundamental reason is the intimate link between mathematics and its teaching. In no other living science is the part of *mise en forme, transposition didactique*, so important at a research level. In no other science, however, is the distance between the taught and the new so large. In no other science has teaching and learning such social importance. In no other science is there such an old tradition of scientists committed to educational questions. In particular, professional mathematicians were involved in the "new math" initiative, when mathematics along with other sciences stressed structural aspects. The situation is different now. Mathematics interacts more strongly with other sciences and technologies, mathematicians are looking outside mathematics, many are oriented towards industry, finance, management; the relative importance many place on teaching and on thinking on educational problems is seemingly decreasing. It is time to draw the attention of mathematicians once again to educational problems, some of which need to be approached with the extended view of what mathematics is now. Clearly, the past and present officers of IMU are convinced of this necessity - in particular, Jacques-Louis Lions and Jakob Palis as well as Ludwig Faddeev and Olli Lehto. Much has to be done, though, to strengthen the links between the community of mathematicians and the activities of ICMI.

Mathematics education is an important social activity, involving billions of children, parents and teachers. It is organized in different ways in different countries. From a conceptual as well as an organisational point of view, it is not easy to translate experience from one country to another. As a simple example, I do not know how to translate *mathematics educator* into French, or *didactique des mathématiques* into English. There are different views and theories in, and on, mathematics education. I learnt some of the general theory of mathematics education from Bent Christiansen, comparative studies from Geoffrey Howson, *Didaktik der Mathematik* from Hans-Georg Steiner, *situations didactiques* from Guy Brousseau; I took part in specialised debates. My general impression is that mathematics education as a field of knowledge is growing very fast, in many ways, like a jungle. The affiliated groups form a partial ordering: psychology, history, sex issues, and, perhaps in the future, competitions and other viewpoints. Partial orders are useful, but they may be dangerous if they become too dominant. There is a need for independent ICMI action, to ensure a better linkage of the different components of mathematics education and to get clear and coherent views, even if not unified ones, on its possible development around the world. In my opinion, ICMI should look comprehensively at all new trends and subfields and try to give coherence to mathematics education as a whole.

Mathematics teachers have different training, duties and status all around the world. But they also have common problems and interests. They usually have only one or two languages, not necessarily English. They are very far from ICMI and know very little of what we are doing

and discussing. However, their enormous mass and weight may be moved deeply by two or three words, particularly when they are destructive (such as "*A bas Euclide*"). How can we help them to move in right directions, to enlarge their views, their responsibilities, and also their prestige? This is certainly a goal for ICMI.

Here we see the need for national, multi-national and regional organizations. ICMI has had good relations with South East Asia, Japan, North and South America and Australia, and it helped in promoting actions in Europe. There are new initiatives now, based on linguistic communities: Spanish and Portuguese speaking countries, China. More needs to be done for Africa. The African Mathematical Union is active and our cooperation should be reinforced. Joint work should be developed within IMU also, in particular with the Commission on Development and Exchanges (CDE).

All these goals and aspects should be reflected in our ICMEs, and it is hardly possible. International Congresses cannot be at the same time scientific *mise-à-jour*, comprehensive, coherent, open to mathematics teachers of all nations and a true expression of linguistic and cultural diversities. The planning committees have to organize, select, promote, offer in such a way that the balance between stimulation and disappointment of participants should be positive. I knew that this was a very difficult task and I did not commit myself very heavily in the planning of the Congresses. I now believe this to have been a mistake. The ICMEs have a considerable effect and they are now one of the most precious traditions of ICMI. They deserve the full attention of all ICMI officers and notably of the President.

The studies are a good way to dig and deepen specific subjects. Can we be satisfied with the five studies already carried out? Certainly not. In one case we were not able to perform the study as originally envisaged: the cognition study was intended to be an ICMI study with the full participation of the Psychology of Mathematics Education group, yet it became, at our request, a PME study. In the other cases there were two major disappointments, in the preparation of the studies and in their effects. An essential step in the preparation of any study should be an international discussion initiated by the discussion document. Due to an unsatisfactory diffusion of our discussion documents or their translations around the world, the discussion was not as extended as it should have been. On the other hand, the impact of the studies depends on the way in which the Proceedings are distributed and made widely available. The selling of the Proceedings by the Cambridge University Press fell below any possible expectations. Here again, National Representatives could have helped more by disseminating information on the studies to come, in checking that the Proceedings were available in relevant libraries, in promoting translations, etc.

The new President of ICMI is my old friend Miguel de Guzmán, a distinguished mathematician and an active writer: as an example of very good popularization and reflection on mathematics and its teaching, I recommend to you his recent book, *Aventuras matemáticas*, which has

already been translated into several languages. You already know the Vice-Presidents, Jeremy Kilpatrick and Lee Peng Yee, and the new Secretary, Mogens Niss: they have already played an important part in ICMI's life, as has Jack van Lint who is once again the IMU representative to ICSU-CTS and so an ex-officio member of the ICMI EC. You will learn more about the new EC members, Anna Sierpinska, Eduardo Luna and Rector Ershov in the next Bulletin.

I express to all of them my best wishes and I hope that they will find the work to be done in the EC as interesting, stimulating and rewarding as it has been for me.

Jean-Pierre Kahane
28.11.1990

FROM MIGUEL DE GUZMAN

THE INCOMING PRESIDENT

My first word as President of the incoming Executive Committee of the ICMI is a warm word of thanks to the Executive Committee which has acted for the past years, and particularly to its President, Jean-Pierre Kahane, and to its Secretary, Geoffrey Howson.

For all those who have been following the development of the ICMI it is quite clear that the last decade has been one of particularly strong activity in many respects: congresses, study meetings, reports, publications,..., greatly due to the intense interest, dedication and efficacy of Professors Kahane and Howson.

It will be a real challenge for all of us in the new Executive Committee to try to keep up with the rhythm at which they have been working for all these years, but we have been assured of their willingness to continue helping us with their counsel and support, Professor Kahane in particular from his position as Member *ex officio* of the incoming Executive Committee.

It is our strong wish, and I think I can speak in the name of the whole Executive Committee, to be at the service of the entire mathematical community in the matters that concern educational problems, trying deeply to involve the efforts of mathematicians and all other persons connected with the transmission of the values of our science at all levels, in order to contribute to the harmonious development of our human culture. To this purpose we would like to ask the persons and groups in different countries to help us with the richness of their experiences so that these can be shared by the whole mathematical community.

Miguel de Guzmán

Hans Freudenthal

17 September, 1905 - 13 October, 1990

Many leading mathematicians have made notable contributions to mathematics education. However, it is doubtful if any gave so much as Hans Freudenthal. His many books, such as Mathematics as an Educational Task and Didactical Phenomenology of Mathematical Structures, are already established as classics; he it was who, as President of ICMI, prompted the first ICME held at Lyons, France in 1969, and who established and for many years edited Educational Studies in Mathematics. No one has tried harder, and done so much personally, to establish mathematics education as a discipline. His influence both in The Netherlands, where the work of IOWO which he led was so significant, and elsewhere was enormous: he was a remarkable teacher and thinker. Moreover, he was a noteworthy critic! Freudenthal fought energetically and with wit against loose or simplistic thinking, shoddy arguments and ignorance. No one who came into close contact with Freudenthal is likely ever to forget him. Many who did not know him personally, will also have cause to remember him and his contribution to mathematics education with deep gratitude.

AGH

Cambridge Mathematics

The Popularization of Mathematics

Edited by **A. G. HOWSON**
and **J.-P. KAHANE**

This book presents the papers arising from the ICMI study seminar on the popularization of mathematics held at the University of Leeds in September 1989. The event was organized in conjunction with a highly successful touring exhibition known as the 'Pop Maths Roadshow'.

Inspired by the discussion document prepared by Howson, Kahane and Pollak, the symposium consisted of three plenary talks followed by sessions discussing the problems faced in the popularization through particular media. Members were present from a variety of backgrounds and discussion groups were devoted to specific themes, such as the image of mathematicians, TV and films, and mathematics in different cultures

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Publication of this new A-level course with many novel features, such as use of computers and calculators, commences in Summer 1991.

A two day meeting is planned in April for overseas educators and publishers who would like to find out about the materials with a view to adaptation. The meeting will probably include a talk about the materials and a visit to a school in Cambridge to see them in use. Those interested in attending should write to Rosemary Tennison at the address below.

Mathematics as a Service Subject

Edited by **A. G. HOWSON**, **J.-P. KAHANE**
and **P. LAUGINIE**

This volume is based on the conference held by the International Commission on Mathematical Instruction at Udene in April 1987. The book begins with a long article by the editor summarising and synthesising some of the main themes and trends debated at the conference. It then goes on to present a number of key papers by international authorities on the role of mathematics in applied subjects such as engineering, computer science and mathematical modelling.

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ICMI Study Series



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MATHEMATICS COMPETITIONS

A STIMULUS FOR

POPULARISING MATHEMATICS

A mathematical problem should be difficult in order to entice us, yet not completely inaccessible lest it mock our efforts. It should be to us a guidepost on the tortuous paths to hidden truths, ultimately rewarding us by the pleasure in the successful solution.

David Hilbert (Paris, 1900)

Some Historical Background

The above quote was part of Hilbert's speech at the second International Congress of Mathematicians at Paris in 1900 when he made the famous 23 challenges to mathematicians of the twentieth century. Mathematical challenges and contests of various kinds have been a stimulus to the development of mathematics for many centuries. For example there was the discovery of the algebraic solutions of cubic and quartic equations by the sixteenth century Italian mathematicians and there was the advancement of the calculus by the Bernoullis in the seventeenth century.

The first formal mathematics competition was held in 1894 by the Mathematical & Physical Society of Hungary. Now called the Kurschak Competition, it was originally named the Eotvos. The success of this school-based competition has been the source of inspiration for the creation of various kinds of mathematics competitions at the local, national and international levels.

For example, the William Lowell Putnam Mathematical Competition (since 1938) in the USA, the International Mathematical Olympiad (since 1959), the International Mathematics Tournament of the Towns (1979) and the Asian Pacific Mathematics Olympiad (1989) are all mathematics problem solving contests.

Computer Based Contests

With the advent of the computer, a new type of contest for school students was created in 1950 by the New York section of the Mathematical Association of America. It became a national competition in 1958. The competition consists of 30-40 short questions with multichoice alternative answers. Similar computer marked contests were started in Canada in the early 1960s, Australia in 1976, the UK in 1986 and perhaps France in 1991. The popularity of these contests can be

measured by the large participation rate. For example the entry in the 1990 Australian Mathematics Competition was 468,000 (that is, 90% of all Australian high schools averaging 190/school or 35% of the total secondary school population). These contests have accumulated large computer data bases from which research on achievement in mathematics is now being generated.

Millions of Participants

It is conservatively estimated that at least ten million students through the world each year attempt a mathematics competition of some kind at the primary, secondary and tertiary levels. The World Federation of National Mathematics Competitions (WFNMC) is preparing a catalogue of such competitions and, at present, has collected details on over 140 competitions from forty-eight countries. The Federation intends to publish a comprehensive list of mathematics competitions details during 1992. In the meantime each issue of the Federation's journal "Mathematics Competitions" has ten-twelve articles on competitions in each issue.

The competitions make use of radio, television, daily newspapers and magazines, and consist of contests such as challenges within and between schools, mathematics days, correspondence contests between cities and countries, international contests within regions and throughout the world.

Although the modus operandi for these competitions obviously vary, there do exist a common themes in their aims. They include statements such as the motivation, challenge, encouragement and identification of students who are interested or talented in mathematics as well as the stimulation of the learning of mathematics and the popularisation of mathematics.

International Mathematical Olympiad

In addition to the general aims noted early, the following international contests all have common additional aims of improving international relations, cooperation and exchange of ideas as well as improving their own national competitions both from an academic as well as an organisational point of view. In particular, the regional olympiads also give encouragement to countries in their area eventually to aspire to send terms to the annual international mathematical olympiads.

The first international Mathematical Olympiad was held in Brasov, Romania, in 1959 with participating teams from Bulgaria, Czechoslovakia, Hungary, Poland, USSR and Romania. Table One "IMO Participation of countries up until 1990" below shows how this humble beginning has spread to all continents of the world.

Table One: IMO PARTICIPATION OF COUNTRIES (as of 1990)

EUROPE	Y	P	H
Romania	1959	30	4
Hungary	1959	29	3
Czechoslovakia	1959	30	3
Bulgaria	1959	30	2
Poland	1959	29	3
USSR	1959	28	3
German D R	1959	28	2
Yugoslavia	1963	26	2
Finland	1965	16	1
Great Britain	1967	22	1
Sweden	1967	22	-
Italy	1967	10	-
France	1967	20	1
Belgium	1969	12	-
Netherlands	1969	19	-
Austria	1970	19	1
Greece	1975	12	-
F R Germany	1977	12	1
Luxembourg	1979	8	-
Spain	1983	7	-
Cyprus	1984	6	-
Norway	1984	6	-
Iceland	1985	5	-
Ireland	1988	2	-
Portugal	1989	1	-
N. AMERICA	Y	P	H
Cuba	1971	17	1
USA	1974	15	1
Mexico	1981	4	-
Canada	1981	9	-
Panama	1987	1	-
Nicaragua	1987	1	-
AFRICA	Y	P	H
Algeria	1977	8	-
Tunisia	1981	8	-
Morocco	1983	7	-

ASIA	Y	P	H
Mongolia	1964	19	-
Vietnam	1974	13	-
Turkey	1978	6	-
Israel	1979	8	-
Kuwait	1982	8	-
Iran	1985	5	-
China	1985	6	1
Hong Kong	1988	2	-
Indonesia	1988	2	-
Philippines	1988	2	-
P. R. Korea	1988	2	-
Singapore	1988	2	-
India	1989	1	-
Thailand	1989	1	-
D. R. Korea	1990	1	-
Japan	1990	1	-
Bahrain	1990	1	-
Macau	1990	1	-
OCEANIA	Y	P	H
Australia	1981	9	1
New Zealand	1988	2	-
S. AMERICA	Y	P	H
Brazil	1979	10	-
Colombia	1981	9	-
Venezuela	1981	3	-
Uruguay	1987	1	-
Peru	1987	3	-
Argentina	1988	1	-
Ecuador	1988	1	-

Y Year the country first participated in an IMO

P Number of times the country has participated in an IMO as of 1990

H Number of times the country has hosted an IMO as of 1988

Regional International Mathematical Olympiads

The IMO has stimulated similar international problem solving contests at regional levels. The following survey summary (see Table Two) of such contests were given at the First International Conference of the WFNMC recently held at Waterloo University in Canada.

Table Two: SUMMARY OF SOME INTERNATIONAL REGIONAL MATHEMATICAL OLYMPIADS

Name	1990 Participating Countries	Year of Origin	Modus Operandi
Asian Pacific Mathematics Olympiad	Mexico, Canada, Korea, Hong Kong, Thailand, Singapore, Philippines, New Zealand, Australia	1989	A correspondence contest; One paper of five questions in four-and-a-half hours; a Country may enter as many students as it wishes, however, the top ten students in a country formally represent their country; Working language is English.
Austrian-Polish Mathematics Competition	Austria, Poland	1978	Host country alternates; Six students in a team; There are individual and team contests each of four-and-a-half hours; Working language is English; Participants consist of students who were not selected in their countries' IMO team.
Balkan Mathematical Olympiad	Albania, Bulgaria, Cyprus, Greece, Romania, Yugoslavia	1984	Countries take it in turns to host the Olympiad; Six students in a team; One four-and-a-half hour paper.
Gulf Mathematical Olympiad	Bahrain, Iraq, Kuwait, Qatar, Saudi Arabia, United Arab Emirates	1988	Countries take it in turn to host the Olympiad; There are six students in a team; Two four-and-a-half hour papers.
Iberoamerican Mathematics Olympiad	Argentina, Bolivia, Brazil, Chile, Costa Rica, Cuba, Ecuador, Mexico, Peru, Portugal, Nicaragua, Spain, Venezuela	1983	A team consists of at most four students; Working language is Spanish; Two four-and-a-half hour papers; countries take it in turn to host the Olympiad.
Israeli-Hungarian Mathematics Competition	Israel, Hungary	1990	Host country alternates; A team consists of four students; Two contests of four hours, one an individual contest, the other a team contest.
Nordic Mathematical Olympiad	Denmark, Finland, Iceland, Norway, Sweden	1987	Correspondence contest; A maximum of twenty students in a team; Four questions in four hours; Working language is English.

International Tournament of the Towns

The International Mathematics Tournament of the Towns is a mathematical problem solving competition started in the Soviet Union in 1979. It is designed to give students in different parts of the country a chance to compete against each other, but allowing them to do this by sitting for the paper in their home town. In 1986 cities in Bulgaria and Poland entered the Competition and in 1988 Canberra, Australia participated. The 1991 contest will include cities in West Germany, Canada, UK, USA and possibly from up to about ten other countries. In all it is expected that over 80 cities will be participating. I believe that the Tournament of the Towns will become the largest international mathematics competition in the world.

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THE INTERNATIONAL GROUP FOR THE RELATIONS BETWEEN THE HISTORY AND PEDAGOGY OF MATHEMATICS

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- Newsletter:** Professor Charles V. Jones, Department of Editor
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AND MATHEMATICS EDUCATION**

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HIROSHI FUJITA

We were delighted to learn that Professor Fujita, a member of the retiring EC, has recently been honoured nationally for his contributions to mathematics and mathematics education.

We congratulate Professor Fujita on this distinction.

INSTITUTIONS FOR MATHEMATICS EDUCATION

6. **AMUCHMA**

The African Mathematical Union Commission on the History of Mathematics in Africa was formed in 1986, with the following objectives:

- a. to improve communication among those interested in the history of mathematics in Africa;
- b. to promote an active cooperation between historians, mathematicians, archaeologists, ethnographers, sociologists, etc., doing research in or related to the history of mathematics in Africa;
- c. to promote research in the history of mathematics in Africa and the publication of its results in order to contribute to the demystification of the still dominant eurocentristic bias in the historiography of mathematics;
- d. to cooperate with any and all organisations pursuing similar objectives.

The main forms of activity of **AMUCHA** are as follows:

- a. publication of a newsletter;
- b. setting up a documentation centre;
- c. organisation of lectures on the history of mathematics at national, regional, continental and international congresses and conferences.

The newsletter referred to above contains, among other items, details of papers presented at recent meetings, current research

interests and suggestions for further research, a bibliographic section, and details of meetings and symposia. The current issue (May 1990) is Newsletter No. 5. The newsletter is published in Arabic, English and French editions, and is free of charge. Requests should be addressed as follows:

Arabic: Professor Mahdi Abdeljaoud
I.S.E.F.C., 43 rue de la Liberté, 2019 Le Bardo
Tunis, TUNISIA.

English: Professor Paulus Gerdes
C.P. 915,
Maputo,
MOZAMBIQUE

(Professor Gerdes is currently Chairman of **AMUCHMA**)

French: Professor Ahmed Djebbar
Département de Mathématiques
Université Paris-Sud
91405 Orsay Cedex, FRANCE

(Professor Djebbar is currently Secretary of **AMUCHMA**)

PUBLICATIONS

1. Teaching Teachers to Teach Statistics (ISI)

The International Statistical Institute will soon be issuing a book with the above title, edited by Anne Hawkins. It represents the proceedings of the ISI Round Table Conference held in Budapest in July 1988. About 30 people have contributed, and the sections of the book will be concerned with The Changing Nature of Statistics, Evaluation of Training Needs and Some Solution, Defining Problem Areas, and Evaluation of Existing Programmes. Each section has contributors from many different countries.

At the time of writing, publication information is not available. Enquiries should be addressed to the

International Statistical Institute,
428 Prinses Beatrixlaan,
PO Box 950,
22709 AZ Voorburg, NETHERLANDS.

2. Creativity, Thought and Mathematical Proof.

(Interchange, Volume 21 No.1, 1990 - The Ontario Institute for Studies in Education)

This is a special issue of the educational quarterly *Interchange*, compiled by Ian Winchester, the journal editor, and Gila Hanna. There are the papers concerned with a variety of aspects of mathematical proof. They address issues of context, historical, social pedagogical, epistemological, philosophical and also issues of dialectics, formal-intuitive, proof-explanation, deductive-empirical, logical-creative. They emphasise, through these two areas, context and dialectics, the pluralistic nature of mathematics and mathematical discourse.

Authors are Edward Barbeau, J.L. Berggren, Daniel Chazan, Gila Hanna, Israel Kleiner, John Leslie, Nitsa Movshovitz-Hadar, Michael Otte, David Wheeler and Ian Winchester.

BCME

The first British congress of Mathematics Education will take place at Loughborough University of Technology, U.K., 13-16 July 1991. It will address issues in mathematics education at all levels.

Further information can be obtained from:

Marion Keeling
BCME Bookings
7 Shaftesbury Street
DERBY DE3 8yB
U.K.

ICTMA 5

The 5th International Conference on the Teaching of Mathematical Modelling and Applications will be held in Noordwijkerhout, The Netherlands, 13-16 September, 1991.

Further information can be obtained from the Chairman:

Professor Jan de Lange
ICTMA 5
OW & OC
Tiberdreef 4
3561 GG Utrecht
The Netherlands

Fax: 31 30 660430
E-mail: ictma5@owoc.ruu.nl

HPM

HISTORY AND PEDAGOGY OF MATHEMATICS

There will be a meeting of the International Study Group on the Relations Between History and Pedagogy of Mathematics (HPM), in Toronto on August 9 - 13, 1992, just before ICME-7 in Quebec. Details are still being worked out, but the contact person will be V. Frederick Rickey, Department of Mathematics & Statistics, Bowling Green State University, Bowling Green, OH 43403, USA.

FIFTEENTH ANNUAL CONFERENCE OF PME

This will be held from 29 June 1991 to 4 July 1991 in Assisi, Italy.

Details from :

Paolo Boero
Dipartimento di Matematica Università
Via L.B. Alberti 4
16132 GENOVA, ITALY

A MESSAGE FROM THE EDITORS

It is now almost eight years since the first ICMI Bulletin produced in Southampton appeared (No. 13, February, 1983). This issue, No. 29, is the last for which we, as editors, have responsibility. During this time the circulation of the Bulletin has increased significantly, and its appearances have become both more frequent and more regular.

Elsewhere in this issue, Professor Kahane writes of the role of National Representatives and National Sub-Commissions. We are most grateful for the help that these have played in reproducing issues of the Bulletin locally and in ensuring that it was well circulated in their countries. However, it is clear that in many countries the Bulletin remains little known. We can only join Professor Kahane in urging that National Representatives see it as their duty vigorously to promote the work of ICMI, its activities and publications.

We have sought to make the Bulletin a useful source of information about meetings and publications. The series of short articles on Journals in Mathematics Education was designed to complement the brief factual announcements of ICMI and other publications. We have also tried to highlight differences in institutional and national structures, for example, by describing mathematics education in a number of countries, and have included articles on specific issues such as Language in Mathematics Education. Our aim was not to suggest that the Bulletin should be a research journal. Rather we wished to help readers who did not have ready access to such journals, or might not be familiar with some current issues of concern.

We must express our gratitude to all those who have submitted articles and information to us for dissemination. We hope that they will continue to help our successors and that others will also take the opportunity to make their journals, activities, meetings, etc more widely known.

The publication of the Bulletin has been greatly helped by a succession of grants from UNESCO. The support which UNESCO has provided for ICMI during these past eight years, in a variety of contexts, is most gratefully acknowledged. We must also thank all the office staff at Southampton University for the way in which they have cheerfully and most efficiently handled the tasks of typing, duplicating, collating, packing and posting the Bulletins. Especial thanks are due to Mrs Beryl Betts who played a major role in this work.

Finally, we wish our successors at Roskilde well - and look forward to seeing how the Bulletin evolves in the coming years.

Keith Hirst, Geoffrey Howson

ACKNOWLEDGEMENT

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of a grant from UNESCO

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LATE NEWS

ICMI STUDY GENDER AND MATHEMATICS EDUCATION

A study is planned to examine issues related to gender and mathematics education from an international perspective in order to acknowledge their role in the learning of mathematics. It will provide an opportunity for discussion and an exchange of information from different countries about trends, emerging knowledge and underlying influences affecting the learning and teaching of mathematics at all levels.

The specific objectives are:

1. To review and examine critically present positions on gender and mathematics education;
2. To exchange information concerning research, policies and practices;
3. To investigate future directions for research and promote international cooperation.

The study arises from a series of discussions between members of IOWME and ICMI. In these discussions the lack of dissemination of information and research findings in the area of gender and mathematics education emerged as a concern and it was felt that an ICMI study would provide a forum both for scholarly discussion and collaboration among researchers and practitioners.

It is hoped that a discussion document will be published late in 1991 and an international seminar is planned for the first half of 1993. Further details will be published in the Bulletin and elsewhere.

Meantime, the following areas are proposed for discussion:

1. Explanatory models of gender differences: factors associated with the learner (cognitive and psychosocial) and with the environment (societal, cultural and educational);
2. Content and form of the mathematical curriculum: views on the nature of mathematics, syllabuses, learning and teaching styles, assessment practices;
3. Research: lessons learned and future directions;
4. Strategies for change: existing intervention programmes and their perceived effectiveness.

