

ICMI

BULLETIN
OF THE
INTERNATIONAL COMMISSION
ON
MATHEMATICAL INSTRUCTION

No. 9

June 1977

Secretariat

c/o Prof. Y. Kawada
Department of Mathematics
University of Tokyo
Hongo, Bunkyo-ku
Tokyo 113, Japan



I C M I

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CONTENTS

I	Report by the President	page 3
II	An Exploratory Analysis of Participants in the First, Second and the Third International Congresses on Mathematical Education (ICME) Jerry B. Becker	4
III	Communication from the Local Organizing Committee of the Third ICME H. Kunle	11
IV	Announcement about an ICMI-Symposium on the Education of Mathematics Teachers (Pre- and In-Service) to be held at Helsinki, August 1978 President and Vice-Presidents of ICMI	12
V	Cooperation between Science Teachers and Mathematics Teachers Sir James Lighthill	14
VI	On Special Issue of ESM on "Change in Mathematics Education since the Late 1950s — Ideas and Realisation" H. Freudenthal	19
VII	Second Communication of the Conference on the Problems of Training of Teachers of Mathematics A. Császár	21

Secretary: Professor Y. Kawada
Department of Mathematics
University of Tokyo
Hongo, Bunkyo-ku
Tokyo 113, Japan

INTERNATIONAL COMMISSION ON
MATHEMATICAL INSTRUCTION

Executive Committee

(1 January 1975 - 31 December 1978)

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Vice-Presidents: Professor B. Christiansen
Professor H. G. Steiner
Secretary: Professor Y. Kawada
Members: Professor E. G. Begle
Professor L. D. Kudrjavcev
Professor Sir James Lighthill

I REPORT OF THE PRESIDENT

S. Iyanaga

A report was given in the preceding issue, no. 8, of this Bulletin on the General Assembly of ICMI at Karlsruhe in last August. The Executive Committee met on the next day, confirmed the outcome of the General Assembly and discussed about the furtherance of our activities. It was agreed in particular that ICMI should support 4 international meetings mentioned in no. 8. Of these, the second communication on the Conference in Hungary is contained in this issue.

There was a joint meeting of ICMI-CTS (Committee on the Teaching of Science of ICSU) in October, 1976. The article by Professor Sir James Lighthill is an outcome of this meeting.

In January, 1977 an ICMI Committee was convened in Paris to advise UNESCO on mathematics education. It was suggested in that meeting that the ESM (Educational Studies in Mathematics) dedicate a special issue to critical reports on change in mathematics education since the 1950s in various countries. Professor Freudenthal, chief-editor of the ESM, is circularizing a letter of invitation to contribute to this special issue of his journal, which is reproduced in the following.

At the occasion of Helsinki Congress in 1978, ICMI will organize a symposium on the Education of Mathematics Teachers as announced in this issue.

Finally, preparations for the ICME-4 are going on in the U.S.A. of which I hope to be able to give report in the next issue.

I regret to have to apologize once again for the delay of this issue, which was scheduled to be published in April.

II AN EXPLORATORY ANALYSIS OF PARTICIPANTS
IN THE FIRST, SECOND, AND THIRD
INTERNATIONAL CONGRESSES ON
MATHEMATICAL EDUCATION (ICME)*

Jerry P. Becker**

FIRST ICME: August 24 - 30, 1969
Lyon, France

SECOND ICME: August 29 - September 3, 1972
Exeter, England

THIRD ICME: August 16 - 21, 1976
Karlsruhe, West Germany

TABLE I

Listing of Number of Participants, by Country
In the First, Second, and Third International
Congresses On Mathematical Education

1st ICME # Participants	2nd ICME # Participants	Countries Alphabetical Order	3rd ICME # Participants
0	0	***Afghanistan	3
6	6	Algeria	1

* Based on listings of participants mailed to Working Members of each Congress and on "An Exploratory Analysis of Participants In the First and Second International Congresses On Mathematical Education (ICME)" by J. Becker, Bulletin, International Commission On Mathematical Instruction, No. 5, April, 1975, pp.20-24.

** Co-Chairman, Panel on U.S. Arrangements for ICME 1976, NCTM Representative, U.S. Commission On Mathematical Instruction, National Research Council.
132 Park Avenue, DeKalb, Illinois 60115

*** Had no participants in the first two ICME's.

1st ICME # Participants	2nd ICME # Participants	Countries Alphabetical Order	3rd ICME # Participants
1	0	Argentina	3
3	17	Australia	38
2	9	Austria	25
0	0	*Bangladesh	1
0	2	Barbados	1
13	17	Belgium	14
0	1	Bermuda	1
0	1	Botswana	0
4	3	Brazil	21
6	5	Bulgaria	4
0	0	*Burundi	1
0	1	Cameroon	1
23	52	Canada	53
0	2	Chad (Tchad)	0
0	1	Chile	3
0	1	Columbia	0
0	5	Congo (Republic of)	4
4	2	Cuba	0
2	5	Czechoslovakia	6
9	13	Denmark	26
0	0	*Dominican Republic	1
2	at least 1	**East Germany (GDR)	3
0	8	Egypt	6
0	2	Ethiopia	0
0	1	Finland	7
202 (host)	125	France	194
0	0	*Gabon	1
0	0	*Gambia	1
0	4	Ghana	3
52	482 (host)	Great Britain	174
		-England 168	
		-Northern Ireland 2	

* Had no participants in the first two ICME's.

** The listing for the 2nd ICME does not reflect which Germany participants were from in many cases. Accordingly, the number of participants from West Germany (FRG) includes those from East Germany (GDR), of which there is at least one and probably several.

1st ICME # Participants	2nd ICME # Participants	Countries Alphabetical Order	3rd ICME # Participants
		-Scotland 3	
		-Wales 1	
0	0	*Greece	1
0	1	Guatemala	1
21	52	Holland	56
0	1	Hong Kong	1
4	4	Hungary	13
1	6	India	6
0	0	*Iran	3
0	0	*Iraq	3
6	20	Ireland	8
28	27	Italy	34
10	9	Israel	18
1	0	Ivory Coast	1
0	1	Jamaica	2
5	39	Japan	75
0	2	Jordan	0
0	3	Kenya	0
0	1	Kuwait	0
8	2	Lebanon	0
0	1	** Lesotho and Swaziland	2
0	2	Liberia	0
0	0	*Libya	2
5	3	Luxembourg	3
1	3	Malawi	1
0	1	Malaysia	1
0	0	*Mali	1
0	1	Malta	1
0	0	*Martinique	1
0	1	Mauritius	0
0	6	Mexico	15
3	4	Morocco	1
0	1	New Guinea	0
0	3	New Zealand	2
0	9	Nigeria	11
0	2	Norway	16

* Had no participants in the first two ICME's.

** One person represented both countries in 2nd ICME, apparently.

1st ICME # Participants	2nd ICME # Participants	Countries Alphabetical Order	3rd ICME # Participants
0	0	*Peru	2
0	1	Philippines	0
5	3	Poland	3
5	3	Portugal	3
0	0	*Qatar	6
0	0	*Republic of China (Taiwan)	4
0	0	*Rhodesia	2
6	5	Rumania	1
3	6	Russia (USSR)	3
0	1	Rwanda	0
0	0	*Saudi Arabia	4
3	1	Senegal	6
0	1	Sierra Leone	0
0	1	Singapore	0
7	10	South Africa	12
1	1	South Vietnam	0
12	7	Spain	10
0	2	Sudan	2
3	16	Sweden	20
2	0	Syria	0
23	19	Switzerland	30
0	0	*Thailand	1
17	6	Tunisia	11
1	0	Turkey	4
0	1	Uruguay	0
93	281	United States	213
0	0	*Venezuela	6
18	42	**West Germany (FRG)	620 (host)
29	6	Yugoslavia	16
0	2	Zaire	0
0	2	Zambia	0
5	2	*Unaccounted For"	0

TOTALS

655 participants 1384 participants
42 countries 76 countries

1854 participants
76 countries

* Had no participants in the first two ICME's.

** See the note ** on p. 5.

TABLE 11

Breakdown by "Areas" of the World
Number of Participants and Corresponding Percentages

	<u>1st ICME</u>		<u>2nd ICME</u>		<u>3rd ICME</u>	
	<u># of part.</u>	<u>% of part.</u>	<u># of part.</u>	<u>% of part.</u>	<u># of part.</u>	<u>% of part.</u>
Africa	38	5.8%	72	5.2%	70	3.8%
Asia (inc. Japan)	6	.9	45	3.3	82	4.4
Australia and New Zealand	3	.5	20	1.5	40	2.2
Central and South America (inc. Mexico)	9	1.4	19	1.4	57	3.1
Eastern Europe and USSR	28	4.2	28	2.0	33	1.8
Western Europe (inc. Great Britain and Ireland)	425	64.9	826	59.7	1215	65.5
Subcontinent (Bangladesh, India, Pakistan)	1	.1	6	.4	7	.4
Middle East (inc. Turkey)	21	3.2	14	1.0	41	2.2
North America	116	17.7	333	24.1	266	14.3
Scandinavia	3	.5	19	1.3	43	2.3
"Unaccounted for Participants"	5	.8	2	.1	0	0
	<u>655</u>	<u>100 %</u>	<u>1384</u>	<u>100%</u>	<u>1854</u>	<u>100%</u>

OBSERVATIONS

- The number of participants increased from 655 to 1384 from the 1st to the 2nd ICME, and from 1384 to 1854 from the 2nd to the 3rd ICME.
- The number of countries represented was 42 for ICME 1, 76 for ICME 2, and 76 for ICME 3. There were 18 countries represented in the 3rd ICME that were not represented in the first and second ICME's.

- France, the host country, accounted for about 31% of participants for ICME 1, followed by USA (14%) and Great Britain (8%).

Great Britain, the host country, accounted for about 35% of participants for ICME 2, followed by USA (20%), France (9%), Canada (4%), Holland (4%), Japan (3%), and West Germany (3%).

West Germany (FRG), the host country, accounted for about 33% of participants for ICME 3, followed by USA (11%), France (10%), Great Britain (9%), Japan (4%), Holland (3%), Canada (3%), Australia (2%), and Italy (2%).

West Germany and France together accounted for about 44% of participants. Western Europe, including Great Britain and Ireland, accounted for about 66% of participants in ICME 3.

- 28 countries showed an increase in number of participants from ICME 2 to ICME 3, with "significant" (10 or more) increases for Australia, Austria, Brazil, Denmark, France, Japan, Norway, Switzerland, West Germany (host ICME 3), and Yugoslavia.

31 countries showed a decrease in number of participants from ICME 2 to ICME 3, with "significant" (10 or more) decreases for Great Britain (host ICME 2), Ireland, and the United States.

- There was a relatively small number of participants in ICME 1 from Asia, the South Pacific, Central and South America, the Subcontinent, and Scandinavia. There was an increase in number of participants from these areas in ICME 2, particularly for Australia, Japan, and Sweden. Africa (190%) and North America (290%) showed large increases in number of participants for ICME 2 over ICME 1.

The areas identified above also showed increases in number of participants from ICME 2 to ICME 3, particularly for Japan, Australia, Brazil, and Mexico. There has been a steady increase in number of participants for Western Europe from ICME 1 to ICME 3.

All "Areas" showed an increase in number of participants from ICME 1 to ICME 2, except for Eastern Europe which stayed the same and the Middle East which dropped slightly. From ICME 2 to ICME 3, all "Areas" showed increases in number of participants, except Africa and the Subcontinent (about the same) and North America, which decreased about 20%.

- Looking at the "Breakdown By Areas":

For the 1st ICME, Western Europe accounted for about 65% of participants, followed by North America (18%), Africa (6%), Eastern Europe (4%), and the

Middle East (3%).

For the 2nd ICME, Western Europe accounted for about 60% of participants, followed by North America (24%), Africa (5%), Asia (3%), Eastern Europe (2%), and Scandinavia (1%).

For the 3rd ICME, Western Europe accounted for about 66% of participants, followed by North America (14%), Asia (4%), Africa (4%), Central and South America (3%), Scandinavia (2%), Australia and New Zealand (2%), the Middle East (2%), and Eastern Europe (2%).

Comments

The "Breakdown By Areas" shows that when a Congress is held in Western Europe, the large majority of participants come from Western Europe - 65% for the 1st ICME, 60% for the 2nd ICME, and 66% for the 3rd ICME. The second largest group of participants comes from North America (Canada and USA) - 18% for 1st ICME, 24% for 2nd ICME, and 14% for the 3rd ICME. The third largest group for each of the three ICME's is Africa, with 6%, 5%, and 4%, respectively (Asia also had 4% for the 3rd ICME). There has been a steady increase in number of participants, from ICME 1 to ICME 3, for Asia (due to Japan), Australia and New Zealand (due to Australia), Central and South America (due to Brazil and Mexico), Western Europe (all three ICME's have been held there), and Scandinavia (due to all three countries). There was an increase for Africa from ICME 1 to ICME 2, with a slight decrease thereafter. The number of participants has remained about constant for Eastern Europe from ICME 1 to ICME 3. For the Middle East, there was a decrease in number of participants from ICME 1 to ICME 2, and quite an increase from ICME 2 to ICME 3. For North America, there was a very large increase (290%) in number of participants from ICME 1 to ICME 2, and a significant decrease (20%) from ICME 2 to ICME 3.

If the 4th ICME is held in the USA, it may be expected that representation from Canada and the USA will increase considerably; indeed, this is recognized as a possible problem. But it should be expected that representation from Mexico and Central and South America would increase too - perhaps this is one of the main reasons for holding the next Congress on this side of the Atlantic. In this connection, it may be commented that it will be important for Spanish to be one of the working languages of the Congress.

It may also be reasonably expected that the number of participants from, say, Australia and Japan will increase significantly, as it did from ICME 2 to ICME 3. Perhaps this will be a time when the People's Republic of China

may send a delegation to an ICME, for the first time. And what about the Europeans coming to the USA? There has been interest expressed among Europeans in coming to an ICME in the USA. Economic considerations would seem to indicate that a sizable number of participants from Western Europe and various Mediterranean countries may be expected to attend an ICME in the USA. It may be expected that an excellent scientific program, with input from a truly international program committee, combined with an opportunity to visit parts of Canada and the USA, would attract a significant number of foreign mathematics educators. Also, if the timing is right, mathematics educators from foreign countries may have an opportunity to visit American schools and universities before returning to their homelands.

As before, it is important that information about the next Congress be made available to the international mathematical education community on as large a scale as possible.

III COMMUNICATION FROM
THE LOCAL ORGANIZING COMMITTEE
OF THE THIRD ICME

H. Kunle*

J. Mohrhardt**

The Local Organizing Committee of the Third ICME at Karlsruhe in August 1976 wants to announce that the List of Full Members was sent out in March 1977 to each participant. It might have happened, however, that some of the participants have not received it because of the change of addresses or of some postal accident. In such cases, the participants are requested to notify the non-receipt to the secretariat of the Committee (address: Universität Karlsruhe, Mathematisches Institut II, Kaiserstr. 12, 7500 Karlsruhe, FRG) in giving their exact addresses. The List will be then sent to them again (as far as the remaining copies exist).

* Professor, University of Karlsruhe, Chairman of the Local Organizing Committee.

** Secretary of the Local Organizing Committee.

IV ANNOUNCEMENT ABOUT AN ICMI-SYMPOSIUM ON
THE EDUCATION OF MATHEMATICS TEACHERS (PRE- AND IN-SERVICE):
WHAT KNOWLEDGE, EXPERIENCE AND UNDERSTANDING OF MATHEMATICS
SHOULD A MATHEMATICS TEACHER HAVE?

TO BE HELD AT THE INTERNATIONAL CONGRESS AT
Helsinki, August 1978

Many mathematicians are professionally involved in the pre- and in-service education of mathematics teachers. This involvement includes preparation and teaching of courses, evaluation of students and programmes, planning and holding of seminars, work on committees and in conferences related to education of mathematics teachers.

There is universal agreement that the teacher of mathematics should have mathematical competence. In particular he should have adequate background-knowledge and experience with respect to the mathematics taught at school. This implies that specific parts of applied mathematics and problem-solving activities should be indispensable components of the educational programme in addition to basic instruction in pure mathematics.

It is expected that through his education the mathematics teacher has developed the ability to analyse elementary mathematics from an advanced point of view and has gained the flexibility necessary for representing mathematics at various levels and by a variety of approaches. It is a matter of debate whether special courses are needed to further this expected competence and how such courses should be related to methods courses and other training components in the area of pedagogy and psychology of mathematics teaching and learning.

Also there is an increasing consensus that the teacher of mathematics should have a balanced view of philosophical problems related to mathematics, and of the role of mathematics in culture and society. Curriculum decisions and even teaching methods are highly influenced by preoccupations and attitudes linked to these themes, and corresponding misconceptions on the part of teachers are often unintended side effects of the standard mathematical training. This calls for an integration of foundational, historical and sociological aspects of mathematics into the educational programme.

It is an important task for all those who are involved in the mathematical

education of mathematics teachers to clarify - for the various teaching levels - what knowledge, experience and understanding of mathematics a mathematics teacher should have. An International Congress of Mathematicians brings together experts from all countries who are most competent to discuss this problem. This is why the International Commission on Mathematical Instruction, a body established by the International Mathematical Union, has chosen the Mathematical Education of Mathematics Teachers as the theme of a symposium during the next ICM to be held at Helsinki, August 1978. An International Programme Committee is being established chaired by the two Vice-Presidents of ICMI, Professor Christiansen and Professor Steiner. Anyone interested in participating in the Symposium is kindly asked to contact either of the co-chairmen, who will also appreciate to receive suggestions regarding the programme of the Symposium.

On behalf of ICMI

S. Iyanaga

President of ICMI

Professor Bent Christiansen
Department of Mathematics
Royal Danish School
of Educational Studies
Emdrupvej 101
DK 2400 Copenhagen NV
DENMARK

Professor Dr. H. -G. Steiner
Institut für Didaktik der Mathematik
Universität Bielefeld
Postfach 86400
D 4800, Bielefeld 1
FEDERAL REPUBLIC OF GERMANY

V COOPERATION BETWEEN SCIENCE TEACHERS AND MATHEMATICS TEACHERS
- COLLABORATIVE PROGRAMME BETWEEN CTS AND ICMI AND UNESCO -

Sir James Lighthill*

The International Council of Scientific Unions (ICSU) has a Committee on the Teaching of Science (CTS) which is very active in organising international discussions on the teaching of all the sciences. One of the members of ICSU is the International Mathematical Union (IMU). However, perhaps because of the prominent place of mathematical instruction throughout educational curricula, IMU's International Commission on Mathematical Instruction (ICMI) pursues also its own very active programme, which includes the holding of large International Congresses of Mathematical Education every four years: the 1972 Congress in Exeter had about 1400 participants and the 1976 Congress in Karlsruhe about 1850.

Great benefits are undoubtedly derived from the frequent opportunities for international discussion of contemporary problems provided by CTS in science education and by ICMI in mathematics education. Nevertheless, those involved have become increasingly aware that the separate organisation of the two groups of activities can cause science curricula and mathematics curricula, which are by no means unrelated, to be discussed in excessive isolation from one another.

Existing arrangements aimed at avoiding such isolation have been found insufficient. These include the existence of an IMU representative on CTS, and the following special efforts on the part of ICMI.

The 1972 International Congress of Mathematical Education (Exeter) included a Working Group 'Links with Other Subjects at Secondary Level'. This emphasized skills in mathematical modelling of scientific problems as one of the important groups of mathematical skills to be communicated in secondary schools and argued that the necessary material can be prepared best through cooperation between science teachers and mathematics teachers (Proceedings**, p.29). The Working Group also received a paper (Proceedings,

* Professor, University of Cambridge, Past President of the ICMI.

** Howson, A.G. (ed.) Developments in Mathematical Education.
Cambridge University Press (1973).

pp.233-240) dealing in some detail with three questions: (i) what mathematical skills are required in the new secondary school science courses; (ii) to what extent do courses in modern mathematics provide for the development of these skills; (iii) in what ways can the work of science and mathematics departments in schools be more closely linked to promote more effective learning of these skills. Finally, the Working Group made recommendations, endorsed by the ICMI Executive Committee (Proceedings, p.306); especially, recommendations on providing support for mathematics teachers and science teachers to work together; on publicising what is already being done in this direction in order to encourage others to attempt cooperative work; and on supporting the production of source materials on topics linking mathematics with other subjects, suitable for use in secondary schools.

Later careful discussion by the Executive Committee brought out the difficulty of ICMI implementing the recommendations, when its own meetings were attended exclusively by mathematics educators. It became evident that, to achieve proper discussion of cooperation between science teachers and mathematics teachers, a programme must be initiated under the joint sponsorship of ICMI and CTS. To this end, a member of the ICMI Executive Committee (J. Lighthill) met two members of CTS (C. A. Taylor, D. G. Chisman) for a preliminary discussion of the matter held in February, 1975. It was agreed to pursue the possibility of a collaborative programme concerned mainly with cooperation between science teachers and mathematics teachers at secondary school level (because the different school subjects are not fully differentiated at primary level). The object would be to hold an international discussion meeting, preceded by the circulation of reports from different countries of such national investigations of these matters as have taken place, and leading to a publication on the subject aimed at a wide market.

Subsequent deliberations at meetings of CTS and at the 1976 International Congress of Mathematical Education (Karlsruhe) confirmed this decision to collaborate, and indeed added to the sense of conviction of all concerned that a joint programme was necessary. Furthermore, the UNESCO Division of Science, Technical and Vocational Education generously gave its powerful support for such a joint programme.

Finally, in October 1976 a Steering Committee for the CTS/ICMI/UNESCO Programme 'Cooperation between science teachers and mathematics teachers' was set up with the following membership:

CTS: C. A. Taylor, J. L. Lewis, D. G. Chisman, A. P. French;
ICMI: J. Lighthill, H. G. Steiner, B. Christiansen;

UNESCO: E. Jacobsen, N. Joel.

It was agreed to aim at a meeting with 30 to 50 specially invited participants in September, 1978, to be held in Bielefeld, Federal Republic of Germany. This should be preceded by careful preparation and distribution of written reports describing experience and plans in the field within various countries. The ultimate product of the preparatory work and of the meeting itself would be a publication, in which a publisher or publishers specialising in books for a mass market might cooperate with UNESCO to bring out material that could be used directly by teachers as well as by those engaged in teacher training.

More recently, members of the Steering Committee have been making individual contacts to ensure that in as many countries as possible a person or group of persons is acting as a focus for preparing papers in this field. Such arrangements have been made already, for example, in Australia, Japan and the U.K. An Editor is being appointed to edit the material thus produced for distribution to those attending the meeting, as well as to edit the final publication.

Among the topics to be covered in preparatory reports and in the final publication are:-

- (a) 'Mathematics in the science lesson': much can be done to help science teachers, when they are using mathematics, to express themselves in such a way that present-day pupils who are taking present-day mathematics courses can understand what is being said as well as possible. In some countries, booklets to help in this have been prepared; are they useful, or is any other particular approach more useful? Conversely, what has been done or should be done to give mathematics teachers information helping them, if possible, to relate the timing of particular mathematical material to the needs of the science lesson?
- (b) 'Philosophical background and educational theory': what are the educational goals to be cooperatively sought (attitudes regarding mathematics in relation to the sciences, skills in 'mathematical modelling' of scientific problems, etc.) and what are the relative merits of different methods (various types of separate, but coordinated, activity in science teaching and mathematics teaching; or different kinds of project work organised cooperatively by science teachers and mathematics teachers)?
- (c) 'Implications for teacher education': is there a need to prepare secondary-school teachers in the skills needed to cooperate with teachers of other subjects; for example, to prepare mathematics

teachers to be able to seek out from science teachers material suitable for use as concrete illustrations of mathematical concepts; or to be able to make known to science teachers matters of notation and methodology used in current mathematical courses so as to avoid confusion in the science classroom ?

- (d) 'Case studies by geographical and subject areas': it may be important to distinguish problems arising in a highly mathematicized science like physics from those arising in a science like biology whose mathematical content has in the past been less although it is now rapidly growing; and, similarly, with problems in different countries (countries with a traditionally abstract approach to mathematical education, or countries whose approach has traditionally been more concrete, or developing countries with a strong emphasis on practical utility in educational curricula). For these reasons, we ask: what has been done or is currently planned in cooperation between mathematics and particular sciences in particular countries ?
- (e) 'Guidelines for cooperation including practical examples': from the information on educational aims, or experience from the past, and on future plans, what can we conclude about particular approaches that can be strongly recommended in particular situations ?

The Steering Committee also noted a topic that it prefers not to see included. There is no intention to discuss ideas for fully integrated mathematics and science teaching at secondary level (if, indeed, such a comprehensive degree of integration is possible). It is by design that the Programme's title includes the word 'Cooperation' but does not mention 'integration'. The Steering Committee does not wish the Programme to be deflected into any massive discussion of detail such as would be needed in relation to schemes (with, in most cases, a rather low chance of coming to fruition) for integrated curricula. By contrast, techniques for cooperation between teachers can be discussed fruitfully, because such techniques are capable of being introduced individually in particular educational systems, or sometimes even in particular schools, as and when they are locally agreed.

With the above background, we invite recipients of this document in different countries to send to any members of the Steering Committee with whom they are in contact.

- (i) existing papers related to the topics (a) to (e) above which have been prepared in their countries;
- (ii) indications of new papers on those topics which they can prepare

or can arrange to have prepared. Such information should be sent as soon as possible and, in any case, not later than 31 August 1977. The names and addresses of members of the Steering Committee are:

- Prof. C. A. Taylor, Dept. of Physics, University College, P.O. Box 78,
Cardiff CF1 1XL, Wales.
- Mr. J. L. Lewis, Dept. of Physics, Malvern College, Malvern, Worcestershire,
England.
- Mr. D. G. Chisman, British Council, 10 Spring Gardens, London SW1, England.
- Prof. J. Lighthill, Dept. of Applied Mathematics and Theoretical Physics,
Silver Street, Cambridge CB3 9EW, England.
- Prof. B. Christiansen, Royal Danish School of Educational Studies,
Emdrupvej 101, 2400 Copenhagen, Denmark.
- Prof. H. G. Steiner, Institute for the Didactics of Mathematics, University
of Bielefeld, Universitätsstrasse, D-48 Bielefeld 1, Federal Republic
of Germany.
- Dr. E. Jacobsen, Division of Science, Technical and Vocational Education,
UNESCO, Place de Fontenoy, Paris 7, France.
- Dr. N. Joel, Division of Science, Technical and Vocational Education,
UNESCO, Place de Fontenoy, Paris 7, France.
- Prof. A. P. French, Physics Department, Massachusetts Institute of Technology,
Cambridge, MA. 02139, U.S.A.

VI ON SPECIAL ISSUE OF ESM ON "CHANGE IN MATHEMATICS EDUCATION
SINCE THE LATE 1950S — IDEAS AND REALISATION"

H. Freudenthal*

Though modernising mathematics education has been a concern of ICMI from its beginning early in the 20th century onwards, the late 1950s meant a new start, widely known as "New Math.". A worldwide evaluation of this period and its results is still lacking. A Committee convened by ICMI to advise UNESCO on mathematics education suggested that ESM dedicate a special issue to what I would call

Change in mathematics education since the late 1950s -
ideas and realisation.

The issue would consist of critical reports on what has happened in various countries. In order to make clear how I would like to interpret this theme, I will first of all stress what the reports are not expected to present:

No formal descriptions of existing or prescribed instruction, such as official teaching programmes, more or less official guidelines, examination regulations, lists of textbooks and other materials, formal lists of objectives, extensive statistical material.

More positively, I will try to guide the ideas of the reporters by a - rather incomplete - list of catch-words, although I do not expect that all of them or even the majority are dealt with in every particular report or that the systematic approach of this list is reflected by the individual reports:

Change in

subject matter,
teaching method,
attitude towards mathematics,
relations between mathematics and other subjects

Change as a process:

the leading ideas -

how did they develop in the course of the years,
how did they manifest themselves in plans, projects,
proposals,
how were they actually realised

* Professor, Instituut Ontwikkeling Wiskunde Onderwijs, Tiberdref 4,
Utrecht, Holland.

the main forces -

general educational, social, cultural developments,
increasing mathematical literacy,
increasing mathematical excellence,
adult education,
applicability of mathematics

the designers -

commissions, committees, curriculum developers,
textbook writers, test designers

the performers -

administration, schools, teachers, students, parents

the tools -

training, retraining, textbooks, syllabi, teacher
cooperation and resistance
by administrations, teachers, parents, public
lessons learned in the past to the benefit of the future.

Change on different levels

school, teacher training and retraining, guidance
in their interrelatedness.

Reaction to change

in other subject areas,
by higher learning,
by parents,
by the public.

I would wish that the analysis of change is

profound,
lucid,
illustrated by concrete data if needed,

and that the particular reports match the standard set by ESM. The size would be between 16 and 32 pages, though I would not object against more extended reports if the length is justified by the contents.

VII SECOND COMMUNICATION OF THE
CONFERENCE ON THE PROBLEMS OF
TRAINING OF TEACHERS OF MATHEMATICS
August 23-27, 1977, Pécs, Hungary

A. Császár*

1. Place and dates

The Conference will take place in Pécs, between 23 and 27 August, 1977. A short opening ceremony will begin at 3.00 p.m. Tuesday 23 August and the last meeting will be on Saturday morning 27 August.

2. Scientific Program

Three sections are envisaged, related to training teachers of 6 to 10, 10 to 14, 14 to 18 years old pupils, respectively. Lectures of invited lecturers will take 45 minutes, including discussion, and those of other speakers 30 minutes. The Organizing Committee will have the right to refuse the application of some of the participants. Those who intend to present papers are requested to send short abstracts of 15-20 lines in one of the official languages: English, French, German and Russian, by 30 May. Interpreters will be provided at the plenary sessions and in one of the sections every day.

The participants will receive the abstracts as well as a collection of about 15 surveys on the development of teachers training in various countries. This topic will be discussed on the basis of these papers; no lectures are presented on these problems.

3. In addition to the above scientific program, non-technical programs (excursions, sightseeing etc.) are prepared.

Registration fee is US\$35 for each participant, and US\$15 for each accompanying person.

For further informations, please contact the Chairman or Mrs. A. Bartal, Secretary of the Organizing Committee, Bolyai János Mathematical Society, H-1368 Budapest, POB 240, Hungary.

* Chairman of the Organizing Committee, Bolyai János Mathematical Society, 1061 Budapest, Anker Kőz, 1-3, 1-111 (1368 Budapest POB 240).

CORRECTIONS
to ICMI Bulletin No. 8, p.23

Names and Addresses of National Representatives of Singapore and United Kingdom should be corrected as follows:

Singapore Professor Lee Peng Yee
 Department of Mathematics, Nanyang University
 Upper Jurong Road, Singapore 22

United Kingdom Professor J. V. Armitage
 Principal
 College of St. Hild and St. Bede
 University of Durham
 England, DH1 1SZ.



