ICMI

BULLETIN

OF THE

INTERNATIONAL COMMISSION

ON

MATHEMATICAL INSTRUCTION

No. 10

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Secretariat

c/o Prof. Y. Kawada

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I C M I

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INTERNATIONAL COMMISSION ON
MATHEMATICAL INSTRUCTION

Executive Committee

(1 January 1975 - 31 December 1978)

President: Professor S. Iyanaga

Vice-Presidents: Professor B. Christiansen
                     Professor H. G. Steiner

Secretary: Professor Y. Kawada

Members: Professor E. G. Begle †
                     Professor L. D. Kudrjavcev
                     Professor Sir Janes Lighthill

I REPORT BY THE PRESIDENT

S. Iyanaga

Eight months have passed away since the last publication of this Bulletin in June 1977. As we intend to publish this Bulletin biannually, the normal interval would be six months; we are two months behind the schedule. I am sorry for this delay.

I have two happy news in relation to the outcome of ICME 3 in Karlsruhe in 1976: the New Trends IV as well as the Proceedings are shortly forthcoming. The New Trends IV, carefully edited by Professor Christiansen will be published by UNESCO in May-June and the Proceedings will be sent soon to the participants from the Local Organizing Committee under the chairmanship of Professor Kunle.

As to the next ICME 4 in the United States, the preparations are going on in the United States Commission on Mathematical Instruction under the chairman-ship of Professor Shirley Hill, but the final decision has not yet been taken on its site and dates.

This issue contains an important article on the cooperation between ICMI and UNESCO by Professor Christiansen and a report on Pécs Conference as well as communications on the forthcoming meetings: in Luxembourg, Manila, Helsinki and Bielefeld. Those in Luxembourg and Manila are taking place already in May; those in Helsinki and Bielefeld in August-September. I hope that interested readers will benefit by these communications.

Added in Proof. I have just received a report from Professor Shirley Hill that the site for ICME 4 has been selected: it will be held August 11-16, 1980 at the University of California, Berkeley.

II   THE COOPERATION BETWEEN ICMI AND UNESCO

B. Christiansen *

Over the past decades, cooperation has fruitfully taken place between UNESCO and ICMI for a number of important purposes. It would hence have been appropriate to give a review of the different cases of collaboration of the past 20-30 years, mentioning their background, scope and objectives, and considering the type of collaboration as well as the outcome. However, this brief article shall only deal with the ongoing cooperation between the Organization and the Commission, linking the present cooperative activities to events of the last few years and to possibilities of the near future.

UNESCO is a large organization with quite a complex administrative structure which has been changing during the years. Therefore, it is not easy to identify the units inside the UNESCO structure with which ICMI is cooperating. However, it should be mentioned that ICMI greatly appreciates its long term cooperation with the former Division of Pre-University Science and Technology Education under the Directorship of Dr. H. A. Foecke. This division was earlier named the Division of Science Teaching, and it has now been changed into the Division of Science, Technical and Vocational Education. The divisions mentioned have established and maintained very close connections with ICMI and with the International Teaching Commissions of the other sciences. Dr. Foecke has now been promoted to higher office within UNESCO, and ICMI welcomes warmly the new director of the Division of Science, Technical and Vocational Education, Dr. Samady. It should likewise be mentioned with great appreciation that cooperation between ICMI and UNESCO has also been canalized through the Division of Higher Education and Scientific Research under the directorship of Dr. Sidney Passman, and that also this collaboration is being continued at present.

Three areas for cooperation will be considered here: (1) The series "New Trends in Mathematics Teaching"; (2) International meetings cosponsored by UNESCO and ICMI; (3) Advisory meetings concerned with planning for the future.

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* Vice-President of ICMI.

1. New Trends in Mathematics Teaching

Although this series is presumably well-known by the readers of the Bulletin, a few facts about its development shall be noted here in order to emphasize the special features of the coming volume IV which is at present being prepared at the responsibility of ICMI under contract with UNESCO.

Volumes I, II and III were published 1969, 1970 and 1972. Volumes I and II were prepared by ICMI, whereas volume III was prepared by representatives of ICMI and other mathematics educators, building in part on a two weeks' meeting, at which these specialists discussed the chapters of the book, while they were still written only in a tentative form.

The two first volumes contained a number of articles on important topics of mathematics education, written individually by internationally acknowledged specialists. Although these earlier volumes were very informative about innovative efforts, they left the reader in doubt with respect to the question of tendencies in the developments of mathematics teaching. In the planning of volume III, UNESCO therefore decided that future volumes should be composed of scholarly analyses of such tendencies, thus bringing the contents of the volumes more into line with their titles. The above mentioned special procedure used in the preparation of volume III was a first means to approach this purpose.

At the end of 1974, just before the present Executive Committee took office, an Ad Hoc Advisory Meeting was convened in Paris by ICMI to advise UNESCO on the implementation of its current and the planning of its future programmes in Mathematics Education. Among the participants in the meeting were the outgoing President of ICMI, Sir James Lighthill, the President to be, Professor Iyanaga, and the two incoming Vice-Presidents of the Commission. Among other themes, the meeting discussed in details whether ICMI could render such assistance to UNESCO in the development of the fourth volume of "New Trends" that further steps would be taken in the envisaged development of the series.

The ideas about the planning of volume IV which emerged through the discussion took as their starting point that this volume should deal with broad topics of general educational interest for mathematics teachers and educators, and thirteen themes of that type were identified. Six of these divided the field of mathematics education according to levels, ranging from pre-school to adult education; whereas the remaining seven themes made a "vertical" division of the field in question, so that each theme would be of interest at all levels, e.g. curriculum development, evaluation, research.

A rich, and quite complex structure was outlined under which the development of chapters on these themes could take place. It was based on the assumption that it would be possible to ensure - through cooperation with the German Organizing Committee for the Third ICME - that a section for each theme could be established at the Karlsruhe Congress, in relation to which a report on the theme could be presented and subjected to analysis and constructive criticism. It further assumed that for each theme should be identified: (1) a specialist of international reputation (a reporter/author), who could first prepare the report and later develop it into a chapter of "New Trends IV" building on all appropriate information received; and (2) an International Advisory Group (of about 10 members), broadly representative both with respect to countries or regions and to aspects of the theme, who could assist in various ways in the development of the report and the chapter. In his work, the reporter/author should aim at doing at least the following things: (1) give an objective presentation of the developments and trends as revealed by the literature and other documents; (2) identify and analyse the problems that arise in this light; (3) suggest actions which might meet the challenges and solve the problems; (4) develop an appropriate bibliography. Clearly the subjective judgement of the author would play an increasing role from (1) through (2), and would presumably be quite strong in (3) and in (4). The members of the Advisory Group, on their part, should: (1) give constructive criticism at the early stage of the process; (2) send information to the author from their country/region and about their specialities; (3) participate at the Congress - or through correspondence - in discussions and analysis of the report.

Thus, at the Paris meeting, the development of "New Trends IV" was foreseen to have the character of a process, and not to consist in the authors' development - in relative isolation - of their own ideas in finished form. Some details about the plans for this process are summarized below:

(a) The reporter should - building on a given, brief indication of sub-themes and aspects belonging to his theme - develop an outline of his intended report. Attempts should then be made to bring the thirteen reporters together for a meeting (with participation of other specialists, e.g. representing ICMI) at which all the outlines could be discussed and analysed, and at which fruitful interaction among the authors could be initiated and ideas emerge regarding appropriate changes in the initial plannings.

(b) Each reporter should next revise his outline according to his experiences at the authors' meeting, forward it to the members of his Advisory Group

for comments and criticism, and - building upon the feed-back - develop his report for use in relation to meetings of his section at the Congress. This report, which by the nature of the process was to be seen as a preliminar document, should be sent to the Advisory Group and to the other authors.

(c) At the Congress the report should, after its presentation, be discussed by a panel (formed among others by the participating members of the Advisory Group) and by the participants in the section-meetings, and subsequently the Advisory Group should meet with the reporter for a final discussion of all experiences.

(d) Finally, an Editorial Board of the volume should preside at a second authors' meeting in Karlsruhe, at which the process of finalization of the chapters could be planned.

Celarly, the only way in which this ambitious plan could possibly be realized would be to utilize the international network established under the auspices of ICMI during later years. Accordingly, UNESCO requested that ICMI took upon itself the full professional responsibility for carrying through the plan outlined above, and ICMI accepted the involved obligations. These were set out in an agreement between UNESCO and ICMI, which provided ICMI with a financial background for the work to be done. Perhaps it should be emphasized here - at a time where the work is coming to its successful conclusion - that although substantial funds were provided, the plan described above calls for such massive professional activity and involves so much travel of authors that the execution of the plan could certainly not have taken place without financial support from other sources (apart from UNESCO and ICMI), and without extremely generous professional assistance offered by numerous colleagues around the world, who have agreed to participate in these cooperative efforts without asking for any support or for any reimbursement of their expenses. Thus the first authors' meeting could only be carried through because generous support was obtained from the VW-Foundation (Stiftung Volkswagenwerk), and the enormous secretarial work and the extensive reproduction during the preparations of reports and chapters could only be made because universities and research institutes of the involved professionals have given their generous assistance.

The value of this cooperation between UNESCO and ICMI seems to be obvious in the case of UNESCO, since the organization obtains the manuscript for "New Trends IV", made under the professional responsibility of ICMI. It must, however, also be clearly recognized that ICMI at this occasion has been

engaged in activities which are very closely connected to the purposes of the Commission. Thus it is of major interest for the Commission to have access to the best obtainable information about tendencies in the development of mathematical education, and moreover this process of identification of such information has served greatly to improve and strengthen already existing lines in the international network of mathematics education and to create numerous new contacts between persons and institutions in this field. Therefore, the cooperation with UNESCO described here is also on the part of ICMI to be regarded as extremely valuable and fruitful.

When "New Trends in Mathematics Teaching", volume IV, becomes available, it will be the proper time to look back upon this whole arrangement and try to learn from both the strengths and the weaknesses which have appeared during the demanding work. Hopefully, the positive aspects will dominate, but nevertheless it might be appropriate in future effots of this type to concentrate on more modest tasks, and such are at present being considered preliminary by UNESCO and ICMI.

2. International meetings co-sponsored by UNESCO and ICMI

Examples of such meetings from the recent years are the Nairobi Symposium on "Interactions between Linguistics and Mathematical Education" (September 1974), and the Bharwari Regional Conference on "Development of Integrated Curriculum in Mathematics for Developing Countries in Asia" (December 1975). Brief reports of these meetings have appeared in the ICMI Bulletin (respectively no. 4 and no. 7), and an extensive report of the first mentioned is available at request to Dr. E. Jacobsen, Programme Specialist (Mathematics), UNESCO, PARIS. The Nairobi Symposium was sponsored by UNESCO in cooperation with ICMI and the then CEDO (Centre for Educational Developments Overseas). The Bharwari Conference was sponsored by ICMI and co-sponsored by, among others, UNESCO; its Convenor and Chairman was the late Professor P. L. Bhatnagar. An example of a future meeting of this type is the collaborative programme between CTS, ICMI and UNESCO which will be held in 1978, and which was described in the ICMI Bulletin, no. 9, by Sir James Lighthill, under its title "Cooperation between Science Teachers and Mathematics Teachers".

A Common feature for these meetings is that the planning takes place by means of a small steering committee in which members representing ICMI cooperate with members representing the other sponsoring bodies and with colleagues working professionally as staff members (Programme Specialists) at UNESCO Headquarters. The importance of such committee work where the purposes of

the meeting are analysed in details and where means to their attainment are discussed in light of the given resources and the existing constraints, can hardly be over-estimated. Although the activities of UNESCO are influenced by the world-wide financial difficulties of these years, it is to be hoped that high priority will be given in the future to programme activities of this type where the conditions for planning of concerted efforts for common purposes seem to be excellent.

3. Advisory meetings concerned with planning for the future

In 1971, 1974 and 1977 meetings have been convened by ICMI under contract with UNESCO with the purpose of advising UNESCO on the implementation of its current and the planning of its future programmes in mathematics education. The important outcomes of the Advisory Meeting in Paris (November 1974) were mentioned above, and a few remarks follow here about the recent Advisory Meeting (January 1977).

These meetings have only few participants, partly for economic reasons, and partly to establish a relevant context for deep and open-ended discussions. At the recent meeting ten specialists from ten countries analysed these themes: (1) Mathematics education in the near future? (2) What can UNESCO do to aid the information flow? (3) What kind of mathematics programme is needed for education of the majority?

The discussions (which also dealt with the important question of the ways in which advice can be given, e.g. by means of consultants) came up with a number of tentative recommendations regarding future actions. One of these proposed that Educational Studies in Mathematics should dedicate a special issue to reports (covering a number of countries) on change in mathematics education over the last decades. Such reports would identify change in mathematics education as a process, and could be helpful for countries, professional groups and individuals who are engaged in decision making about their future programmes and actions. The results of this recommendation are known from the ICMI Bulletin, no. 9, where the editor of ESM, Professor Freudenthal, made an announcement of such a special issue. Another recommendation concerned the problems of mathematics education for the majority; it implied that an International Study Group affiliated to ICMI could investigate this problem-field (working title "Mathematics for the Majority"), and also that this theme might be appropriate for volume V of "New Trends in Mathematics Teaching". These examples indicate the form and character of the work of the Advisory Meeting, which, in accordance with its purposes, is mainly of internal interset for the Organization and the Commission.

The above brief account cannot do proper justice to its title, since there are important instances of collaboration which are not of the types here considered. However, the account will have shown the importance of the cooperation, and the examples will have indicated the conditions under which it takes place. Finally, on behalf of ICMI, I express the Commission's great appreciation of the good collaboration which has taken place over the years between UNESCO and ICMI, and I also take occasion to emphasize that the Commission sincerely hopes that this collaboration may be continued and enlarged in the years to come. In the future development it will be of the highest importance, both for UNESCO and for ICMI, that all instances of cooperation are means for the attainment of purposes which are common to the Organization and the Commission, and that, in each instance, the resources offered from the two parties are appropriate in relation to the outcomes of the activity in question.

III   REPORT OF THE
INTERNATIONAL CONFERENCE ON THE PROBLEMS OF
TRAINING OF TEACHERS OF MATHEMATICS
23-27 August, 1977, Pécs, Hungary

Ákos Császár[*]

The Bolyai János Mathematical Society with the assistance of the Hungarian Ministry for Education and the ICMI (International Commission on Mathematical Instruction), organized an international conference on 23-27 August 1977 at Pécs with the title: "The problems of training of teachers of mathematics". The main issues at the conference were: the mathematical curriculum of the up-to-date teacher training; the place and role of methodology and pedagogy in the teacher training; the international endeavours and experiences for harmonizing the professional and pedagogical aspects of the teacher training; the structural forms of teacher training; the possibilities of the further training of teachers. The lecturers dealt in each of these issues both with the actual state of teacher training and with the new endeavours.

The conference aroused a great international interest. 156 participants /93 Hungarians among them/ arrived from 23 countries. 53 lectures were given during the five days.

The topics at the plenary sessions were:

1. The problems of up-dating the training of math-teachers /J. Surányi, Hungary/;

2. Teacher training between programming and education /H. Freudenthal, The Netherlands/;

3. The role of the ability for abstraction in the teacher training /J. Szendrei, Hungary/;

4. What knowledge experience and understanding of mathematics should a mathematics teacher have? /H.-G. Steiner, GFR/;

5. On methodical preparing of mathematics teachers /A. A. Stolyar, USSR/;

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[*] President of Organizing Committee. Professor, University of Budapest.

6. Recent trends in the philosophy and organization of further training of high school mathematics teachers /C. Gaulin, Canada/;

7. Analysis speziell für Lehrer /K. Härtig, GDR/;

8. Nouveaux projects italiens pour les curricula et le recyclage des professeurs d'école moyenne supérieure /C. Sitia, Italy/;

9. Les travaux du diplome et leur rôle dans la préparation des maîtres de la mathématique /A. Z. Krygowska, Poland/;

10. Methods of problem-solving as an integral part of the teacher training /J. Sedivý, Czechoslovakia/.

These followed by small lectures in the following sections:

I methodology;

II training of teachers of pupils at the age of 6-10, 10-14, 14-18;

III the mathematical curriculum of teacher training;

IV a special session dealt with the teachers' further training.

Austria, Belgium, Canada, France, GDR, Hungary, India, Luxembourg and the USSR these had been compiled by specialists of these countries and subjected to each country which was given to the participants about the structure of teacher training. At the beginning of the Conference reports had been distributed among the participants; there was a round-table discussion on the third day with Ákos Császár in the chair. The authors of the reports were comforted by many questions - both beforehand and on the spot - and an interesting discussion emerged.

A concert, an excursion and a party provided an opportunity for creating precious professional relations for emerging talks and discussions.

This was the fourth international conference in Hungary dealing with

mathematics teaching /1973 Eger;
1974 Budapest: the problem of teaching of mathematics in the elementary school;
1975 Nyiregyháza: the problems of mathematics' teaching in the secondary school/.

Many well-known specialists repeatedly visited Hungary and contributed to a deeper understanding of the problems involved.

The conference served as a source of useful ideas and informations concerning the reform of teacher training in many countries.

The Organizing Committee together with the "Schroedel Verlag" has taken steps to publish a volume containing the national reports and the texts of the most important papers read during the Conference.

IV LUXEMBOURG SEMINAR

29 May - 3 June, 1978

Lucien Kieffer*

<u>Theme</u>: Calculators in School Teaching

<u>Languages</u>: French - German - English

<u>Lectures</u>:

1. A. Bajpai (Loughborough): Why Use Calculators in Secondary School
      Teaching ?

2. A. Deledicq (Paris): Sortir des images d'un ordinateur.....
      pour illustrer les mathématiques

3. J. Eickel (München): Top-down Entwicklung von Algorithmen in
      Maschinerprogramme.

4. A. Engel (Frankfurt): Subject undecided.

5. Mrs. B. Fletcher (Darlington): Use of Calculators - The Problem as
      seen by the Classroom Teacher.

6. Th. Hatt (Strasbourg): Subject undecided.

7. L. Klingen (Bonn): Systematik der Schulmathematik durch Aufbau
      modularer Algorithmen.

8. W. Mann (Truro, GB): Subject undecided.

9. F. Michel (Bruxelles): Emploi des calculatrices programmables
      (élèves de 16-18 ans).

10. J. Nachtergaele (Brux.): Utilisation des calculatrices dans l'ens.
      second. (fonctions, équations, inéquations) - Atelier.

11. J. Nievergelt (Zürich): Beyond the Calculator: Interactive Systems
      for Education.

12. G. Noel (Mons): Minicalculatrices et analyse; calcul d'erreurs.

13. C. Pair (Nancy): L'algorithmique ou comment l'informatique amène
      à faire des mathématiques.

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* ICMI-Representative of Luxembourg.

14. A. T. Rogerson (London): Subject undecided.

15. W. Vanhamme (Louvain-la-N.): De la présence de calculatrices dans
    la classe à la découverte de notions mathém. (1er cycle
    second.)

16. G. Vonk (Utrecht): The Role of Computers and Informatics in the
    Didactics of Mathematics.

17. B. Winkelmann (Bielefeld): Taschenrechner und Fachdidaktik:
    einige strategische Perspektiven.

The lectures (45-50 minutes), followed by a discussion, will be held in the

Assembly Hall of the
Collège d'Enseignement Moyen, 157, Avenue Pasteur
Luxembourg - City .

Summaries or overhead projector transparencies translated from German and
French into English will be available.

For further informations refer to:

Professor Lucien Kieffer
ICMI-representative of Luxembourg
Séminaire CIEM Luxembourg 1978
Collège d'Enseignement Moyen
157 Avenue Pasteur
Luxembourg.

V. THE FIRST SOUTHEAST ASIAN CONFERENCE

ON MATHEMATICAL EDUCATION

29 May - 3 June, 1978, Manila, Philippines

Fr. Bienvenido F. Nebres, S.J.*

Place and Dates

The Conference will be held May 29 - June 3, 1978 at the Philippine International Convention Center, Metro Manila, Philippines.

Sponsoring Organizations

The Conference is organized by the Mathematical Society of the Philippines (MSP) with the assistance of the Government of the Republic of the Philippines, the International Commission on Mathematical Instruction (ICMI), the Southeast Asian Mathematical Society (SEAMS) and the Mathematics Teachers Association of the Philippines.

Objectives of the Conference

1. .To provide a regional forum for the presentation of the results of studies made with regards to

    a) the type of mathematics programs currently offered at all levels,

    b) the type of mathematics programs that should be and could be offered so as to meet the goals of developing countries like the Philippines and other Southeast Asian Countries,

    c) the training and upgrading of the mathematics staff in our schools.

2. To explore ways of making the problems of mathematical education known to the public and to our governments so as to obtain the needed support.

3. To explore ways of regional cooperation in mathematical education and research.

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* Professor, Ateneo de Manila University.

Preparations for and Organization of the Conference

National Mathematical societies in the Asean countries and Hongkong are preparing for the Conference by studies on mathematical education at all levels, and in particular at the upper Secondary and Tertiary-Graduate levels. The MSP is conducting a national survey to get a profile of Tertiary-Graduate mathematical education in the Philippines.

As in most Regional and International Conferences, it is expected that the majority of the participants will come from the host country. However, the organizers are exerting every effort to make the Conference a truly regional one.

To accomplish this, the scientific program will de divided into Plenary Sessions, Division Sessions and Workshops/Lectures. Invited papers will be read at the Plenary Sessions with all participants attending. Invited papers will be followed by a panel discussion and/or open forum. Simultaneous Division Sessions for the Elementary, Secondary, the Tertiary-Graduate levels will enable the delegates to choose sessions in which they are interested and/or involved, as well as enable the Conference to deal with all three levels in the six days alloted to the Conference. To provide the opportunity for in depth discussions and interactions among delegates of Asean countries, there will be several Working Groups composed of 20-30 delegates. The Working Groups are expected to discuss thoroughly the problems presented during the Plenary and Division Sessions and come up with proposals and/or resolutions which will be read before the Closing Ceremonies on the last day.

Invited Speakers and Papers for the Plenary Sessions:

The role of mathematical organizations in the improvement of mathematics education.

> Prof. Shokichi Iyanaga
> Professor Emeritus, University of Tokyo
> President, International Commission on Math. Instruction

Mathematics in Southeast Asia, where we are and where we are going.
> Fr. Bienvenido F. Nebres, S. J.
> Dean, The Graduate School and College of Arts and Sciences
> Ateneo de Manila University
> President, Mathematical Society of Philippines and
> Southeast Asian Mathematical Society

The training and professional life of mathematics teachers. Equipping the teachers to play a dominant role in improving mathematical education.

> Prof. Jean Dhombres
> Scientific Counsellor
> French Embassy Canada
> Former Director, Institute for Research in Math. Education
> (Nantes, France)

> Prof. Zbigniew Semadeni
> Deputy Director, Institute of Mathematics, Polish Academy
> of Sciences
> Chief Editor, Wiadomosci Matematyczne

> Prof. Arthur Engel
> Professor of Mathematical Education
> University of Frankfurt, West Germany

Division Meetings: Participants will choose upon registration which Division(s) to attend. Two or more section meetings will be held simultaneously. Scheduled topics are:

1. Mathematical Education at the elementary level.

2. Mathematical education at the secondary level.

   a) for those going to college
   b) for those going into vacational schools
   c) for those who finish schooling at this level

3. Mathematics in the last two years of high school.

4. Mathematical education at the college level.

   a) for mathematics majors
   b) for the physical sciences
   c) for the biological sciences
   d) for the behavioral sciences
   e) for engineering
   f) for economics
   g) for social sciences

5. Mathematical education of prospective elementary, secondary and college teachers.

6. Mathematical education at the graduate level.

7. On mathematical research

   a) How did research begin in (name of country)
   b) What direction should mathematical research take in developing countries
   c) Regional cooperation in research.

8. How can the problems of mathematical education be made known to the public and to our governments?

Partial List of Speakers for the Division Sessions:

- Use of Calculators in Secondary Mathematics
     Prof. Sin Hitotumatu
     Research Institute of Mathematical Sciences
     Kyoto University

- Is the Ph. D. necessary for college teachers? Is it sufficient?
     Prof. Louise Hay
     University of Illinois at Chicago Circle

- The impact of computers on undergraduate education
     Prof. Richard Larson
     University of Illinois at Chicago Circle

- Prof. Teh Hoon Heng
     Dean of the Faculty of Science, Nanyang University

- Prof. Chew Kim Lin
      President, Operations Research Society

- Prof. Jean Dhombres

- Prof. Zbignew Semadeni

- Report on the Regional Center for Education in Science and Mathematics (RECSAM)
     Mr. Chin Pin Seng
     Director, RECSAM

- Reports on mathematical education of different ASEAN countries

There is a registration fee of P100 (US $15).

In addition to the scientific program, sight seeing tours, demonstrations at computer centers, receptions, and instructional materials and book exhibitions will also be organized.

ROLE OF SEAMS*

The Southeast Asian Mathematical Society (SEAMS) is instrumental in convening the First Southeast Asian Conference on Mathematical Education. The Conference is a result of the constant efforts of SEAMS to help generate activities in different Asean countries and to help national societies bring the problems of mathematical education to the attention of the public and of national governments.

SEAMS was organized through the initiative of Prof. Wong Yung Chow of Hongkong University. It was formally organized during its first meeting held at Nanyang University, July 24-28, 1972.

From its foundation, SEAMS has been active. It has organized or helped to organize some 20 regional and national mathematical conferences, symposia and workshops. The primary objective behind the first activities which were of a general nature, was to provide the opportunities for mathematicians in the area to meet and know each other, to discuss and seek solutions to common problems and share their experiences and successes. In less than six years, SEAMS has reached the stage where it can now sponsor workshops and seminars in specialized areas of mathematics.

(The Society co-sponsored with UNESCO a regional workshop in numerical analysis and computer science at Penang, Malaysia in May 1977. A workshop on automata and related topics with Prof. Arto Saloma of Finland and Dr. James Kearns of AIT (Asian Institute of Technology) as guest speakers is the latest SEAMS sponsored activity for 1977).

The Society publishes a quarterly Newsletter and a semiannual Bulletin which is mainly devoted to expository and survey articles, research problems, research announcements, reviews and abstracts and papers on mathematical education.

SEAMS sees its main function as that of a catalyst and coordinator. It encourages meetings in different Asean countries so as to stimulate and generate activities aimed at strengthening member societies. This has proved a sound policy. The 1975 MSP Summer Institute in Graph Theory here in Manila with Prof. Claude Berge as principal lecturer projected a favorable image of the MSP has helped to attract governmental support for the MSP.

In the immediate future, the efforts of SEAMS will be devoted to the setting up of a network of mathematical centers in the region with one node or center in each member country and one of these centers acting as Regional Coordinating Center. For this project, Prof. Lions, Secretary General of IMU, is helping

the Society to get the backing of UNESCO.

For 1978, in addition to the Manila Conference, SEAMS has scheduled its bi-annual meeting in Bangkok in July, and a mathematics symposium in Kuala Lumpur, which will be hosted by the University of Malaysia. 1979 will see the result of French support in the region in the Franco-Southeast Asian Mathematical Conference. Much remains to be done, some member countries still have a long way to go but there is cause for hope. For the present, the prevailing mood in SEAMS is one of optimism.

* The data in this section come from "Development of Mathematics in South-east Asia: The Experience of SEAMS" which will be read by Dr. Lee Peng Yee of Nanyang University at the Conference in Kartoum, Sudan.

VI   ICMI-SYMPOSIUM ON THE EDUCATION OF MATHEMATICS TEACHERS

DURING THE INTERNATIONAL CONGRES OF MATHEMATICIANS

Helsinki, August 15-23, 1978

Theme of the Symposium:

What Knowledge, Experience and Understanding of Mathematics

Should a Mathematics Teacher Have?

I

On the basis of the ideas explained in the first announcement for the symposium (this Bulletin, No. 9) and based on various reactions received from experts from various countries, the small core-committee which met in Copenhagen March 16-17 around the Vice-Presidents of ICMI, developed a tentative program and the following overall strategy:

1. The symposium would take place in the afternoons of August 16 through 18.

2. Two half-days should be devoted to the <u>various dimensions</u> of the theme, each being treated by an <u>invited speaker.</u>

3. A third half-day should be reserved for selected <u>reports on existing models</u> which take into account special aspects of the theme.

4. The <u>introductory talk</u> should cover the theme in its complexity and expose the various aspects and their interrelationship. It should be given 45 minutes - 15 minutes for discussion.

5. The <u>other talks</u> will have to be concentrated on 20 minutes + 10 minutes discussion.

6. Further contributions related to the theme are recommended to be placed in the <u>Congress Section</u> 19 (History and Education).

7. A <u>publication</u> is planned which will include the papers presented at the symposium in full length, further material chosen from the contributions in the section as well as additional background material.

8. At the end of each half-day, there should be a <u>panel discussion</u>. The panel is suggested to consist of the speakers, the chairpersons and a discussion leader.

II

As a guiding idea for structuring the program, the <u>analysis of mathematics in various contexts</u> seemed to be most fruitful and appropriate to attract participants of a Congress of Mathematicians. Mathematical Education itself represents a particular context for mathematics, which is better understood if one also considers other contexts such as philosophical and foundational problems, history, computer science and applications, all of which also play a specific and important role in education and especially teacher education. On this basis the following program, topics and speakers, as well as chairpersons and discussion leaders are suggested:

Wednesday, August 16

14.00 - 15.00: Mathematics Education among other Contexts for Mathematics (Griffiths, Southampton)

15.00 - 15.30: Mathematics in the Context of Computer Science (Knuth, USA)

15.30 - 16.00: Foundations, Epistemology and Meta-Language: Precise Terminology of Complex Discussions within Mathematics Education (Kuyk, Antwerp)

16.00 - 16.30: The Context of Applied Mathematics and Mathematical Model Building: What Experience and Knowledge Should a Secondary School Teacher Have? (Steiner, Bielefeld)

17.00 - 17.30:
17.00 - 17.30: Relations between Advanced and Elementary Mathematics (Freudenthal, Utrecht)

17.30 - 18.30: Panel-Discussion

Chairpersons: Frank Adam, U.K.
Henry Pollak, U.S.A.

Discussion Leader: M. Otte, Bielefeld

Thursday, August 17

14.00 - 14.30: The Historical and Social Context for Mathematics: What Role Should it Play in the Education of Mathematics Teachers (Wussing, Leipzig)

14.30 - 15.00: The Role of Problem Solving and Heuristics in the Education of Mathematics Teachers (Glaeser, Strasbourg)

15.00 - 15.30: How Should Educational Theory be Related to other Components in the Education of Mathematics Teachers? (Davidov, Moscow)

15.30 - 16.00: Coffee/Tea-BREAK

16.00 - 16.30: The Professional Life of Mathematics Teachers. Should the Mathematics Teacher be a Mathematician? (Fletcher, G.B.)

16.30 - 17.00: What Does Educational Research Say about Mathematics Teachers and Their Education? (Cooney, USA)

17.00 - 18.00: Panel-Discussion

Chairpersons: Semadeni, Warszaw
Kawada, Tokyo

Discussion Leader: Christiansen

Friday, August 18

14.00 - 14.30: The Cracow-Model (Krygowska)

14.30 - 15.00: Problems and Models for the Situation in Latin-America (D'Ambrosio, Campinas)

15.00 - 15.30: Problems and Models for the Situation in African Countries (Touré, Ivory coast)

15.30 - 16.00: Coffee/Tea-BREAK

16.00 - 16.30: The IOWO-Model (N.N. of IOWO)

16.30 - 17.00: The IREM-Model (Revuz, Paris)

17.00 - 17.30: Problems and Models for South-East Asian Countries (Nebres, Manila)

17.30 - 18.30: Panel-Discussion

Chairpersons: Fischer, Klagenfurt
Lighthill, Cambridge

Discussion Leader: B. Neumann, Australia

This is still a tentative program which may be changed. Professor H. G. Steiner would be happy to receive suggestions from interested persons, possibly before the end of April.

VII   INTERNATIONAL STUDY GROUP ON THE RELATIONS
BETWEEN THE HISTORY AND THE PEDAGOGY OF MATHEMATICS

L. F. Rogers

There were International Congresses on Mathematical Instruction in 1968, 1972 and 1976. At the 1972 Congress, held in Exeter, England, there was a "working group" (EWG II) concerned with the relations between the history and the teaching of mathematics. The activities of this group were continued at the 1976 Congress in Karlsruhe under the co-chairmanship of Professor P. S. Jones (University of Michigan, U.S.A.) and R.J.K. Stowasser (University of Bielefeld, F.R.G.).   The Executive Committee of ICMI has now approved the affiliation of this study group under the title "International Study Group on Rleations Between History and Pedagogy of Mathematics, cooperating with the International Commission of Mathematical Instruction".

The principal aims of this Study Group are as follows:

1. To promote international contacts and exchange information concerning:
   (a) Courses in History of Mathematics in Universities, Colleges and Schools.
   (b) The use and relevance of History of Mathematics in mathematics teaching.
   (c) Views on the relation between History of Mathematics and Mathematical Education at all levels.

2. To promote and stimulate interdisciplinary investigation by bringing together all those interested, particularly mathematicians, historians of mathematics, teachers, social scientists and other users of mathematics.

3. To further a deeper understanding of the way mathematics evolves, and the forces which contribute to this evolution.

4. To relate the teaching of mathematics and the history of mathematics teaching to the development of mathematics in ways which assist the improvement of instruction and the development of curricula.

5. To produce materials which can be used by teachers of mathematics to provide perspectives and to further the critical discussion of the teaching of mathematics.

6. To facilitate access to materials in the history of mathematics and related areas.

7. To promote awareness of the relevance of the history of mathematics for mathematics teaching in mathematicians and teachers.

8. To promote awareness of the history of mathematics as a significant part of the development of cultures.

There will be a programme of lectures, seminars and discussions on these themes at ICM Helsinki (15th - 23rd August 1978).

Any person attending ICM 1978, or who is interested in the activities of this group, is asked to contact:

> Leo F. Rogers, Secretary, International Study Group on
> Relations Between History and Pedagogy
> of Mathematics
> Digby Stuart College, Roehampton Institute of Higher Education
> London SW15 5PH, England.

VIII   COOPERATION BETWEEN SCIENCE TEACHERS
AND MATHEMATICS TEACHERS

The International Council of Scientific Unions (ICSU), through its Committee on the Teaching of Science (CTS), is organising in collaboration with the International Commission on Mathematical Instruction (ICMI), the International Commission on Physics Education (ICPE) and Unesco a seminar on cooperation between science teachers and mathematics teachers to be held in BIELEFELD, FEDERAL REPUBLIC OF GERMANY from SUNDAY 17 SEPTEMBER to SATURDAY, 23 SEPTEMBER 1978.

The seminar will be for 30 to 50 specially invited participants interested in cooperation between science teachers and mathematics teachers. The main language of the seminar will be English.

The steering committee for the conference consists of:

     CTS   C.A. Taylor, J.L. Lewis, D.G. Chisman
     ICMI   J. Lighthill, H.G. Steiner, B. Christiansen
     ICPE   A.P. French
     Unesco E. Jacobsen, N. Joel

The seminar will be concerned with cooperation at <u>secondary school level</u>. The object would be to hold an international discussion, preceded by the circulation of reports from different countries of such national investigations of these matters as have taken place. It will lead to a publication of material on the subject aimed at a wide market and to detailed recommendations for follow-up action and possibly a bigger conference. Dr. A.T. Rogerson of Westfield College, London University has already been invited to distribute material to those attending the seminar and to edit the final publication.

The work of the conference will be of two kinds: Plenary Sessions, which consider a particular problem which cuts across all the different disciplines, and Working Groups which will consider these and other problems in relation to the interface between mathematics and a particular discipline. There will also be opportunity for ad hoc Working Groups on other specific topics.

All expenses at the seminar will be paid for those invited to attend. It is expected that they will come for the whole seminar and not just for part of it. Some funds will be available to help with travel expenses though it is hoped that most participants will get some support from within their own countries.

TOPICS TO BE COVERED

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 'mathe-
   matical 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 mathe-
   maticised 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 seminar's title includes the word 'Cooperation' but does not mention 'integration'. The Steering Committee does not wish the seminar 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.

MATERIAL INVITED

With the above background, the Steering Committee invites those coming to the seminar to submit to Dr. A.T. Rogerson, Westfield College, Kidderpore Avenue, Hampstead, London NW3 7ST,

(i) existing papers related to the topics A-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.

PRELIMINARY DRAFT PROGRAMME

Sunday 17th
  2.30-5.30   Registration

Monday 18th
  9-12.30   Plenary sessions: 1. Applications of Mathematics
                                2. Contribution from separate disciplines
                                   a. Physics
                                   b. Chemistry
                                   c. Biology

2.30-5.30	Plenary sessions:	3. Langulage problems as between mathematics and the sciences
		4. Socialisation of mathematics and science teachers

Tuesday 19th

9-12.30	Plenary sessions:	5. Cognitive problems
		6. Teacher Education
2.30-5.30	Group meetings	

Wednesday 20th

9-12.30	Group meetings
2.30-5.30	Excursion

Thursday 21st

9-12.30	Group meetings	
2.30-5.30	Plenary sessions:	7. Mathematical Modelling
		8. Crystallography

Friday 22nd

9-12.30	Group meetings
	Reports from Groups
2.30-5.30	Final Session

PROFESSOR EDWARD G. BEGLE

We were informed of the sad news that Professor Edward G. Begle, member of the Executive Committee of ICMI, passed away on March 2, 1978 at age of 63. He died in Palo Alto, Satnford of emphysema after he had been hospitalized in February.

After he had made important research work in topology, he turned to mathematical education; everyone knows his great leadership in organizing SMSG in the United States.

The world community will not forget his important contributions.

The following lines due to Professor Jim Wilson at the University of Georgia tell us about the last days and the memorial services of Professor Begle.

"Ed's health was tenuous for some time. For several years he had battled emphysema. In December 1976 he suffered a collapsed lung and was in critical condition. Breathing was accomplished by a respirator for 19 days and his vocal cords were damaged by exposure to oxygen. His recovery was slow and never more than partial. He did not return to teaching duties at Stanford until September 1977. His "therapy" during early 1977 was to read material and begin to summarize his thoughts in a book on <u>Critical Variables in Mathematics Education</u>.

By the end of the summer 1977 he had finished a draft of his book but he was very weak and his voice was very limited. Nevertheless he wanted to meet his classes at Stanford and did so. Late in the Fall quarter some of his classes began coming to his home to meet in order to converse his strength.

Ed was hospitalized in February 1978 for treatment of herpes zoster. While in the hospital, he developed a lung infection, and with his body already weak, the doctors could not control the lung infection. He died of lung failure on March 2.

The memorial services at Stanford were a tribute to him as a scholar, leader, friend, and human being. There were four eulogies, a Bach organ recital, prayers, and a closing of music by a Scottisch Bagpiper. Ed was especially fond of the pipes and his Scottish ancestry. The piper played from the back of the chapel. Then, as he played, he turned and walked slowly from th chapel and across the courtyard. To those of us in the chapel the sour of the pipes slowly faded and was replaced by a prayerful silence."