

ICMI

BULLETIN
OF THE
INTERNATIONAL COMMISSION
ON
MATHEMATICAL INSTRUCTION

No. 11

December 1978

Secretariat

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

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Tokyo, 113, Japan

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 James Lighthill

I REPORT BY THE PRESIDENT

S. Iyanaga

The Eighth General Assembly of the International Mathematical Union was held in Otaniemi, Finland on August 11-12, 1978. The activities of ICMI during 1975-78 were reported on the first day, for which appreciation was expressed by the Assembly. On the second day, the ten Members-at-Large of ICMI for the next term 1979-1982 were elected as follows:

H. Whitney	(U.S.A.)
M. Barner	(B.D.R.)
E. Castelnuovo	(Italy)
H. Halberstam	(U.K.)
P. Hilton	(U.S.A.)
Y. Kawada	(Japan)
L.D. Kudrjavcev	(U.S.S.R.)
B. Malgrange	(France)
B.H. Neumann	(Australia)
Z. Semadeni	(Poland)

As noticed in IMU Bulletin No.14, the Past President of ICMI, the Secretary of IMU, and the representative of the Union on the ICSU Committee on the Teaching of Science (C.T.S.), are members ex-officio of ICMI and Professor Christiansen agreed to be IMU representative on CTS. The President Montgomery of IMU then nominated Professor H. Whitney as President of ICMI.

The present ICMI Executive Committee held its last meeting in Helsinki on August 21, to which Dr. Jacobsen from UNESCO and Professor Whitney, President-elect of ICMI, were invited to join. Professor Christiansen and Dr. Jacobsen reported, in particular, that the publication of New Trends IV is under way. Close collaboration between UNESCO and ICMI was reminded and wishes were expressed for its further continuation. During the meeting, Professor Whitney stressed the importance of the stand point of children in matters of education and indicated that Professor Erlwanger shares his view.

The preparations for ICME 4 to be held in Berkeley, California in August 1980 were going on in USCMU, chaired by Professor Shirley Hill. It was decided recently that Professor Henry Pollak will preside the International Program Committee of this Congress.

Finally, the membership of the next Executive Committee of ICMI was decided

as follows:

President: Professor Hassler Whitney
Secretary: Professor Peter Hilton
Vice-Predidents: Professor Bent Christiansen
Professor Ubiratan D'Ambrosio
Members: Professor Stanley H. Erlwanger
Professor B.H. Neumann
Professor Z. Semadeni

Development of mathematics and of mathematical instruction should be ever-continuing human activity. We have made our efforts for the past four years for promoting mathematical instruction but left certainly undone many things for the future. May I express my heartfelt gratitude to all who have collaborated with us and my most sincere wishes for the future success of the ICMI in the good hands of the new Executive Committee.

Added in Proof. A letter just arrived from Professor Pollak says, in particular, that the first announcement of ICME-80 (the next International Congress of Mathematical Education in 1980) will be sent out in April 1979 and request for that announcement should be addressed to:

ICME-80, Department of Mathematics
University of California
Berkeley, Calif. 94720
U.S.A.

II REPORT OF
THE FIRST SOUTHEAST ASIAN CONFERENCE
ON MATHEMATICAL EDUCATION

Manila, May 29 - June 3, 1978

Sister I. C. Coronel, f.m.m.*

The First Southeast Asian Conference on Mathematical Education was held from May 29 to June 3, 1978 at the Philippine International Convention Center, Metro Manila. It was organized by the Mathematical Society of the Philippines (MSP) with the assistance of the National Science Development Board (NSDB) and the cooperation 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 (MTAP).

1. Preparations for the Conference

Preparations for the Conference began in August, 1976 after Fr. Bienvenido F. Nebres, S. J., President of the Southeast Asian Mathematical Society (1977-1978) and of the Mathematical Society, came back from the Jlu, 1976 SEAMS biennial meeting in Bandung, Indonesia and announced that the Philippines would host the Conference in 1978.

An Organizing Committee, composed of MSP and MTAP members was appointed to supervise preparations for the Conference. Seminars and workshops designed to look into the problems of mathematical education at all levels, were held in different regions of the Philippines.

Professor S. Iyanaga, ICMI President gave much encouragement to the Organizing Committee. He showed much interest in the Conference from the beginning and gave his full support to it.

Outside the Philippines, Professor Lee Peng Yee of Nanyang University coordinated with the Organizing Committee in involving the different member organizations of SEAMS.

* President, MTAP, Coordinator of the Conference.

2. The Programme

The Conference began with the opening ceremonies at 9:00 a.m. on May 29, 1978 with a welcome address by the MSP vice-president and a keynote address of Dr. Melecio Magno, Chairman of the National Science Development Board of the Philippines. For the Conference, 1,085 local mathematics teachers at all levels and 20 foreign mathematicians from Japan, France, Poland, Australia, Indonesia, Malaysia, Singapore, Thailand and Hongkong converged at the Philippine International Convention Center in a concerted search for solutions to current problems in mathematical education.

To enable the Conference to discuss the problems of mathematical education at all levels in six days, there were plenary sessions for all participants and division sessions for those involved with elementary, secondary or tertiary-graduate mathematical education.

2.1. Papers for the Plenary Sessions

The topics for the plenary sessions were on problems of general interest. The papers were read on the first day of the Conference. To give the participants the chance to react to the papers presented, there were open forums after related papers. The themes of these papers and the speakers were:

- 1) The role of mathematical organizations in the improvement of mathematical education - Professor S. Iyanaga, Japan
- 2) The interaction between mathematics and society: report of the Khartoum Conference on Developing Mathematics in Third World Countries - Fr. B. F. Nebres, S.J., Philippines
- 3) The professional life of mathematics teachers - Professor Dhombres, French Embassy, Canada
- 4) Equipping teachers to play a dominant role in improving mathematical education - Professor J. Giraud, France
- 5) The mathematical training of primary school teachers - Professor Z. Semadeni, Poland
- 6) Teaching mathematics in the national language - Dr. R. M. J. T. Soehakso

2.2. Division sessions

Division sessions on elementary, secondary and tertiary-graduate mathematical education were held simultaneously on May 30-31, 1978.

Participants were free to choose the sessions they were interested in. The papers read in the division sessions were on problems specific to the level of mathematics discussed in the division. All sessions were followed by open forums. The papers presented in the division meetings and the corresponding speakers were:

A. Tertiary Division

- 1) Philippine Undergraduate Mathematics - Ms. Fe. N. Reyes, Philippines
- 2) Philippine Graduate Mathematics - Dr. Jose A. Marasigan, Philippines
- 3) Professional Growth of College Mathematics Teachers - Professor Louise Hay, Chicago
- 4) The Need to Strengthen the Mathematics Curriculum in Engineering Schools - Professor Ali Macawaris, Philippines
- 5) Mathematics in Physics - Professor Salvador Gonzalez, Philippines
- 6) Mathematics in Social and Biological Sciences - Mr. Lydia Flores, Philippines
- 7) The Role of Mathematics in Operational Research - Professor Chew Kim Lin, Singapore
- 8) Survey Report: A Profile of Tertiary Mathematics Education - Sr. Iluminada Coronel, f.m.n., Philippines
- 9) A Brief Survey of University Teaching and Learning Method in Mathematics - Professor R. F. Turner-Smith
- 10) Calculator Experiments in Japan - Professor Sin Hitotumatu, Japan
- 11) Some Views on Geometry Courses in School and University - Professor Wong Yung-Chow, Hongkong

B. Secondary Division

1. Some Implications from the NCEE Mathematics Results - Dr. Miguela Flores
2. The Implications of the FAPE Testing Program to Mathematics Education - Mr. W. C. Wong and Mr. K. S. Lo, Hongkong

3. The "New Math": The Hongkong Experience - Mr. W. C. Wong and Mr. K. S. Lo, Hongkong
4. Polynesian Children Learning a Formal Structure - Professor J. S. Conroy
5. Findings from a Study: Mathematics for Prospective Secondary Mathematics Teachers - Ms. Rosita Tiojanco
6. Stimulating Mathematics Learning - Professor Frank Vahovitch, Philippines

C. Elementary Division

1. Soutele Findings: Implications for Elementary School Mathematics Instruction - Dr. Minda Sutaria, Philippines
2. Concept Learning in Mathematics among Children at the Transitional-Formal Age Group - Ms. Lydia Templonuevo, Philippines
3. Research on Problem Solving Abilities of Children Studying Mathematics - Dr. Lilia Dube, Papua New Guinea
4. Children's Mathematical Learnings from Unstructured Situations - Ms. Milagros Cabales, Philippines
5. Language and Mathematics - Dr. Rosario Maminta, Philippines
6. Language Precision and Mathematical Understanding - Dr. Milagros Ibe, Philippines
7. A Learning Continuum for Elementary Mathematics - Ms. Edith Carpio
8. Critical Difficulties in Elementary School Mathematics: Prevention and Remediation - Ms. Beatriz Soriano
9. Tongan Curriculum Development at the Elementary Level - Prof. J. S. Conroy
10. Inservice Teacher Education and the Elementary Mathematics Curriculum in the Gilbert Islands and Western Samoa - Prof. B. C. Low
11. Return to the Basics: Issues and Problems - Dr. Lourdes Sumagaysay

12. Pre- and in-service education of Elementary School Mathematics Teachers: Present Status and Predictions
- Ms. Carmen de la Peña
13. Teacher Education for Mathematics - Prof. Zbigniew Semadeni, Poland

2.3. Workshops

The whole of the fourth day and the morning of the fifth day of the Conference were devoted to workshops of the different divisions, during which the participants discussed specific problems of mathematical education. The workshops were designed so as to come up with proposals and recommendations for the improvement, upgrading or enrichment of mathematical education at their own level. The elementary and secondary division workshops came up with proposals and recommendations on: the pre-service and in-service training of teachers, changes in the current Philippine elementary and secondary mathematics curricula, and supervision. The tertiary-graduate division workshops came up with proposals and recommendations on: the pre-service training of secondary mathematics teachers, the undergraduate and graduate programs, the introduction of more relevant mathematics into the mathematics courses required in the undergraduate programs for the natural, social, biological and physical sciences, and the professional growth of teachers.

2.4. Lectures

In the afternoon of the fifth day, there were lectures on content and methodology, a workshop on visual aids in mathematics and a film session for those participants who had finished their work in the division workshops.

2.5. The Last Day of the Conference

The last day was summing up of the work of the previous five days. In plenary session, Fr. B. Nebres, S.J. began by a talk on "Mathematics in Southeast Asia: where we are and where we are going". The talk was followed by reports of the rapporteurs of the three divisions and an open forum. In the afternoon, the Conference was closed by Dr. Juan Manuel, Ministry of Education and Culture.

2.6. Other Activities

During the Conference, there were book exhibits by different book publishers and companies.

While the division workshops were in session, elementary and secondary participants took turns in attending lectures and demonstrations on computers in several centers.

2.7. Social Activities

The social activities during the Conference were intended to give the participants periods of relaxation as well as occasions for personal interaction. Tours through the Philippine International Convention Complex and a film presentation on Philippine history were arranged by divisions for all participants. While local participants were at workshops, foreign participants went on an excursion to see the scenic beauty of Tagaytay City. In the evening of the second day of the Conference, the foreign participants, local speakers and members of the Organizing Committee were honored in a dinner given by the MSP and for a friendly gathering of all participants, a cocktail was held in the evening of the fifth day of the Conference.

3. Documentation of the Conference

Participants received copies of the Programme of the Conference and mimeographed copies of the papers presented in all sessions they attended.

The Proceedings of the Conference will be published and copies are expected to be ready around the end of March, 1979. The Proceedings will contain the full versions of all papers and the summarized reports of the division workshops. All participants will receive a free copy of the Proceedings. A limited number of orders can be filled if you write:

The Mathematical Society of the Philippines
c/o Ateneo de Manila University
P.O. Box 154, Manila
Philippines

III REPORT OF THE ICMI SEMINAR
CALCULATORS IN SCHOOL TEACHING
Luxembourg-City, 29 May - 3 June 1978

L. Kieffer*

The Seminar can be considered as the continuation of those held at Echternach in 1965, 69 and 73. In spite of an inconvenient date in the school year - only Luxembourg's schools had a week's holiday in late May - more than 135 participants were registered coming from 12 different countries. Luxembourg, with its 350.000 inhabitants, lying on the linguistic border between Germany and France cannot boast pedagogical innovations. So it only takes care of organization and invites foreign specialists to deliver lectures.

The list published in the ICMI Bulletin (No. 10, 1978, pp.14-15) may be completed as follows:

- A. Engel (Frankfurt): Algorithmen für Taschenrechner
- Th. Hatt (Strasbourg): Informatique et statistique multidimensionnelles (élèves de 15 à 18 ans)
- W. Mann (Truro): Calculators as an Aid to the Teaching of Mathematics
- A. T. Rogerson (London): Of Machines and Men.

The Seminar was opened in the presence of the Secretary of State for Education and of the ICMI - Vice-President B. Christiansen.

To facilitate understanding, the organizers translated abstracts of the presentations into the other languages and copies were available in the lecture-hall. Two overhead projectors, often with transparencies in two languages proved very useful. However in the general discussion slight difficulties of understanding could not be prevented.

The general theme of the Seminar - it arose from the round table discussion at the 1976 ICMI Conference at Karlsruhe - offered a wide range of presentations from the pocket calculators, simple or programmable, informatics and algorithmics to the school computer and its many possibilities.

* ICMI-Representative of Luxembourg, Collège d'Enseignement Moyen, 157 Avenue Pasteur, Luxembourg

As the "Proceedings" will be published I shall mention only the main trends of the lectures.

Most of the British and Belgian presentations concentrated on the advantages offered by simple hand-held calculators (for pupils from 11 to 15 years). Their use reduces the time spent on routine computation, enables many concepts to be better developed and facilitates the solution of realistic practical problems. Nevertheless the practising teacher introducing the calculators may be confronted with many day-to-day difficulties as it results from the N. I. E. Recommendations (1976) and from British School Projects (SMP, Durham, ...). Teaching materials exhibited in a workshop afforded the continental participants an excellent idea of these experiments.

The advantages of programmable calculators in upper forms permitting numerical experimentation and intuitive approaches to concepts (e.g. limits) were emphasized. But most continental speakers were in favor of the school computer using a high level language equipped with keyboard and graphical display. The visual representation of the solution of a problem provided by a plotter creates much more immediate impact than a list of numbers.

Algorithms become more and more important in the teaching of mathematics and pupils must be introduced to programming techniques. Many beautiful algorithms (for HHC) were given and it was shown how the efficiency of algorithmic solutions can be improved and how standard building blocks can be used by the students to construct a program of reasonable length to solve complex problems.

After a philosophical "prose-poem" the question of professionalism in mathematics education was raised which was discussed at the end of the Seminar. Calculators have definitely changed the "paper and pencil" computation. The role of the teacher is essential, he must be informed and motivated in order to avoid the repetition of the errors made at the introduction of "New Maths". More Institutes of Didactics are needed to increase the information flow and to improve the international network in mathematics education. As the weather was ideal the social programme consisting of visits of the historic town and the modern European Centre, an excursion, receptions by the Municipality and the European Community fostered discussions between the participants.

IV REPORT OF
ICMI-SYMPIOSIUM ON "THE EDUCATION OF MATHEMATICS TEACHERS"
Helsinki, 16-21 August, 1978

Hans-Georg Steiner*

For all those particularly interested in mathematics education and the education of mathematics teachers the symposium which was held during the International Congress of Mathematicians, Helsinki, 15-23 August, 1978 offered a rich and attractive program. The symposium took place on four half-days in the Porthania Building, one of the main centers of congress activities. It was attended by about 200 participants.

The guiding ideas and a first draft of the program have already been published in this Bulletin (No.10, March 1978). The actual program was distributed among all congress members and was structured as follows:

Wednesday, August 16, 14.00-17.30

- 14.00: Opening by Professor H.G. Steiner, Bielefeld, FRG
Professor H.B. Griffiths, Southampton, UK:
Mathematics Education among other Contexts for Mathematics
- 15.15: Professor W. Kuyjk, Antwerp, Belgium:
Foundations, Epistemology and Meta-Theory: Parameters of Complex
Discussions within Mathematics Education
- 16.00: Professor D. Wheeler, Montreal, Canada:
Mathematization as a Pedagogical Tool
- 16.45: Dr. H. Mehrtens, Berlin (West):
Social History of Mathematics: Scope, Problems, Examples
- Chairmen: Professor Frank Adams, Cambridge, UK
Professor Y. Kawada, Tokyo, Japan.

* Vice-President of ICMI, University of Bielefeld, FRG.

Thursday, August 17, 14.00-16.45

14.00: Professor H. Wussing, Leipzig, GDR:
The Historical Context for Mathematics: What Role should it play in
the Education of Mathematics Teachers?

14.45: Panel Discussion
(Griffiths, Kuijk, Wheeler, Mehrtens, Wussing, Adams, Kawada, Otte)

Chairman and Discussion Leader: Professor M. Otte, Bielefeld, FRG.

Friday, August 18, 14.00-18.00

14.00: Professor H.G. Steiner, Bielefeld, FRG:
Relations between Elementary and Advanced Mathematics

14.45: Dr. Mary Grace Kantowski, Gainesville, Florida, USA:
Teaching for Problem Solving

15.30: Dr. T.J. Fletcher, Darlington, UK:
Is the Teacher of Mathematics a Mathematician or not?

16.15: Professor Th.J. Cooney, Athens, Georgia, USA:
What does Educational Research say about Mathematics Teachers and
their Education?

Chairmen: Professor Z. Semadeni, Warsaw, Poland
Professor W. Dörfler, Klagenfurt, Austria

17.00: Panel Discussion
(Steiner, Kantowski, Fletcher, Cooney, Semadeni, Dörfler, Christiansen)
Discussion Leader: Professor B. Christiansen, Copenhagen, Denmark.

Monday, August 21, 18.00-21.00: Problems and Models for Teacher Education
related to various Countries and Regions.

Professor U. D'Ambrosio, Campinas, Brazil:
Problems and Models for the Situation in Latin-America

Professor S. Touré, Abidjan, Ivory Coast:
Problems and Models for the Situation in African Countries

Dr. Jose A. Marasigan, Manila, Philippines:
Problems and Models for the Situation in South-East-Asian Countries

Professor A.Z. Krygowska, Cracow, Poland (read by Professor Semadeni):
Teacher Education at the Cracow Teachers' College

Professor G.L. Lukankin, Moscow, USSR:

The Education of Mathematics Teachers in the USSR

Professor A. Revuz, Paris, France:

Teacher Education as an Activity of the French Research Centres IREM

Professor Shumaker and Leenderts, Utrecht, Netherlands:

Teacher Education as an Activity of the Dutch Centre IOWO

Chairman: Dr. E. Jacobsen, Unesco Headquarters, Paris

Panel Discussion:

(D'Ambrosio, Touré, Marasigan, Semadeni, Revuz, Shumaker, Leenderts,
Neumann, Jacobsen)

Discussion Leader: Professor B. H. Neumann, Canberra, Australia

Closing: Professor B. Christiansen, Copenhagen, Denmark.

The proceedings will be published by and available from the Institute for the Didactics of Mathematics (IDM), University of Bielefeld, D-4800 Bielefeld, FRG, Universitätsstrasse.

V REPORT OF
JOINT ICMI/ICPE/CTS/UNESCO/IDM-CONFERENCE
ON
COOPERATION BETWEEN SCIENCE TEACHERS AND MATHEMATICS TEACHERS

Bielefeld, FRG, September 17-23, 1978

Hans-Georg Steiner*

The conference was jointly sponsored by ICMI, the International Committee on Physics Education (ICPE), the Committee on the Teaching of Science (CTS) of the International Council of Scientific Unions (ICSU), UNESCO, and the Institute for the Didactics of Mathematics (IDM) of the University of Bielefeld, FRG. Financial support came from UNESCO and the Foundation Volkswagenwerk (VW Hannover, FRG). The conference was held at the Center for Interdisciplinary Research (ZiF) of Bielefeld University. The organizational and Technical preparation and performance was done by IDM, its academic content and structure was jointly designed by the Steering Committee, a U.K. working group together with Dr. Rogerson from SMP, London, and an FRG working group together with IDM. The 60 participants came from 16 different countries.

Overall goals for the conference had been stated in a circular by the Steering Committee which was printed in ICMI-Bulletin No.9, June 1977. The circular puts particular emphasis on the production of booklets in which material and teaching models should be developed to help bridging the gaps between mathematics and the sciences as school subjects. The material, which should be addressed to teachers, would contain elaborated examples from the contact point of view, methodological considerations on the utilization of mathematics in the sciences, mathematical model building, outlines of curricula with emphasis on systematic cross-reference between mathematics and the sciences. Specific needs of developing countries should be taken into account.

During the conference, after intensive discussions and on the basis of a variety of oral and written contributions, about 50 titles of related booklets were identified and first arrangements made for the writing and editing. An

* Vice-President of ICMI, University of Bielefeld, FRG.

editorial committee under the chairmanship of Professor Charles Taylor, Cardiff, president of CTS, will be in charge of further promoting this program.

A second component of the conference was devoted to the analysis of the various epistemological, organisational, educational, sociological and psychological factors and conditions which highly determine the present situation as related to cooperation with its various obstacles and deficiencies. They have to be reflected if innovative models and strategies are to be designed. Such factors are e.g.:

- Effects of different philosophies and methodologies, related to mathematics and the sciences, on the school curricula. (Analysis, in particular, from the perspective of the history and the sociology of sciences and school-subjects.)
- Effects of teacher-training (socialization of teachers; acquired knowledge and understanding of their subject, acquired educational theory and practise etc.) and the professional situation of teachers.
- Cognitive differences between mathematics and the sciences in their thinking and working methods, Individual and developmental aspects of these differences; learning difficulties among pupils; problems of motivation etc.
- Conditions specifically related to developing countries.

The work of the conference consisted in plenary talks and discussions, and to a considerable amount in group activities.

Besides opening addresses by the director of the ZiF and Professor Steiner, the following plenary papers were read:

- | | |
|--------------------|--|
| James Lighthill: | Applications of Mathematics in the Sciences |
| Charles A. Taylor: | The Role of Mathematics in Physics |
| Roman Sexl: | Mathematics, Information-Theory. Applications to Various Fields in Science and Technology |
| André Revuz: | Possibilities and Obstacles in the Coordination and Cooperation between Mathematics and Science Teachers, Analyzed from an Epistemological Point of View |
| Alan T. Rogerson: | The Project of Producing Booklets for Use by Practising Classroom Teachers |
| Uri Haber Schaim: | The Acquisition of Mathematical Skills Relevant to Science |

Karl-Peter Hadeler: Mathematical Model-Building in Biology

Five working-groups were established:

(A) Science Applications and Model Building as Part of Mathematical Curricula

Chairman: Max Bell, Chicago

(B) Mathematics in the Physics Classroom

Chairman: Jean Pierre Provost, Nice

(C) Mathematics in the Biology Classroom

Chairman: Bernard Winkelmann, Bielefeld

(D) Mathematics in the Chemistry Classroom

Chairman: Werner Dierks, Kiel, FRG

(E) Analysis of Conditions

Chairman: André Revuz, Paris

Working group (E) splits into 4 subgroups:

(E₁) Epistemological Problems

(E₂) Cognitive Aspects

(E₃) Socio-psychological Conditions

(E₄) School Organisation, Models and Strategies for Innovation.

Problems and concerns of developing countries were made a dimension of the work in all groups.

A large variety of papers and short presentations were prepared as an input into the group work. Great emphasis was laid on the cooperation between the groups which was organized in addition to group reports and discussions in plenary sessions by means of joint meetings, group interviews with members from other groups, appointments between individual members from different groups etc.

The proceedings of the conference will contain the plenary talks, contributions and short papers prepared for the conference, results and recommendations from the groups. They will be published as a special issue of the series "Schriftenreihe des IDM" and distributed by the IDM (Institute for the Didactics of Mathematics, D-4800 Bielefeld, Universitätsstr.) and UNESCO.

VI REPORT OF
CARINTHIAN SYMPOSIA ON DIDACTICS OF MATHEMATICS

Willibald Dörfler*

In September 1976 the Institute of Mathematics of the UBW in Klagenfurt (Austria) organized the First Carinthian Symposium on Didactics of Mathematics on the subject "Applied Mathematics in Secondary Education". This year as the second Symposium a conference on "Proofs in Mathematical Education" took place from September 26 to 29 in Klagenfurt and it was organized also in the name of ICMI represented by its Vice-President Professor Dr. H.G. Steiner, Bielefeld, FRG. Almost 170 didacticians and teachers of all school levels took part in the conference coming mainly from Western Germany and Austria but also from Great Britain, Netherlands, Poland, France, German Democratic Republic and Switzerland. The program consisted of 4 invited one-hour lectures and 40 contributed half-hour lectures. The main lectures: W. Walsch: "Zur Entwicklung von Fähigkeiten im Beweisen im Mathematikunterricht mittlerer Klassen", A. Bell: "Stages in Understanding Generalisation and Proof", H. Freudenthal: "Konstruieren, Reflektieren, Beweisen in phänomenologischer Sicht", H. Bürger: "Beweisen im Mathematikunterricht - Möglichkeiten der Gestaltung in der Sekundarstufe I und II".

The short lectures comprise several aspects of the subject which can be summarized into some categories. One of them contains lectures on proofs within special subjects of school mathematics. Here great interest was devoted to geometry and to the question if geometry is able to motivate the pupil towards an understanding what a proof is for. There were hints that because of the modelling character of geometric objects and the special relation of them to the modelled "real" objects geometry might not be very well suited for this purpose. Other lectures were devoted to the conception of proof, to exactness and completeness of proofs. It seems to be a common opinion that complete proofs are possible at different levels of rigour.

Here one should mention the examples of proofs by actions (premathematical proofs) given by Prof. Kirsch. Some other subjects: understanding of proofs and its examination, methods to raise this understanding and the understanding

* Head of Department of Mathematics, Klagenfurt University.

of the necessity of proofs, induction and other methods of proof.

The proceedings of the first symposium have already appeared as:

Schriftenreihe Didaktik der Mathematik, Band 1,
ANWENDUNGSORIENTIERTE MATHEMATIK IN DER SEKUNDARSTUFE II,
ed.: W. Dörfler, R. Fischer, Verlag Johannes Heyn, A -
Klagenfurt.

The proceedings of the second symposium are to appear in spring 1979 (same publisher).

VII ICMI-REPORT ON CHANGES IN MATHEMATICAL EDUCATION
PUBLISHED IN ESM

H.G. Steiner*

At a meeting held in Paris in January 1977, a committee established by ICMI to advise UNESCO on mathematical education recommended that Educational Studies in Mathematics (ESM) devote special issues to changes in mathematics education. Professor Freudenthal, chief editor of ESM, chose as title: "Change in Mathematics Education Since the Late 1950's - Ideals and Realization?" and invited experts from various countries to give national reports for which he designed some overall guidelines. 16 reports have been received and published in issues No. 2 and 3 of Vol. 9 (1978) of ESM. The countries are: Australia, Bangladesh, France, Great Britain, Hungary, India, Iran, Netherlands, Nigeria, Poland, Sierra Leone, Sri Lanka, Sudan, Thailand, USA, West Indies.

November, 1978

* Vice-President of ICMI.

