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C O N T E N T S

INTERNATIONAL COMMISSION ON
MATHEMATICAL INSTRUCTION

Executive Committee

(1 January 1975 - 31 December 1978)

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I REPORT BY THE PRESIDENT

S. Iyanaga

In the last issue No. 5 of this Bulletin published in last April, we have announced our intention to bring out this No. 6 in August. We have to apologize for the delay caused by the following reason.

During the time interval of April-August, there were two international meetings related to ICMI as announced in No. 5 (pp. 13-14):

(1) International Colloquium on Evolving a Mathematical Attitude on the Secondary Education (Age Range 14-18 years) (Hungary)

(2) International Symposium on Combinatorics and Probability in Primary Schools (Poland).

We wanted to include the reports of these meetings in this issue. However, both of them took place toward the end of August and we could receive the report of (2) only recently.

I hope the reader will forgive us for this delay and that he will be glad to know the success of these meetings as seen in the reports in this issue.

The preparation for the third ICME (International Congress on Mathematical Education) in Karlsruhe in August 1976 is steadily proceeding in the hands of the Executive Committee of the IPC (International Programme Committee) under the chairmanship of Professor H.-G. Steiner and of the Local Organizing Committee under the chairmanship of Professor H. Kunle according to the project outlined in No. 5 (pp. 16-18). In last April, the First Circular was sent out and Professor Steiner wrote to each National Committee of ICMI to ask for cooperation. Thus I believe that preparations are also being made in each of the adhering nations.

It is my hope to be able to publish the next issue No. 7 in January 1976 with reports of the meetings held in the period: September-December 1975 and news on the third ICME.

Corrigendum to my report in No. 5:
- In the 10th line from the bottom of p. 3 "Pedagogische Hochschule, Bayreuth" in parentheses, should read "Zentrum der Didaktik der Mathematik, Universitat Karlsruhe".

II   PLANNING THE SECOND ICME, EXETER 1972

Elizabeth Williams [†]

The committee appointed to organise the proceedings of the Exeter Congress was aware from the outset that there were special considerations to be kept in mind when planning the second in what is expected to be a long line of quadrennial conferences. The experience of the pioneer congress at Lyon and the comments of participants upon it had to be carefully examined. Its most successful features must be retained and thus provide a recognisable structure for future programmes. Yet the second congress should try to meet the demands made at Lyon for less time to be given to formal lectures and the reading of prepared papers, and for more opportunities to be provided for active participation by members. It was also thought to be essential that important recent developments and contemporary controversies should be found a place. It was for these reasons that it was proposed to include a large number of working groups with considerable freedom to suggest topics and to plan their own activities. There was some scepticism in the committee about securing enough people to work out programmes and organise such groups but in the event 38 groups were affectively planned under the direction of a member of committee and each helped by a member based in the host country. This part of the Congress programme, the freest and most spontaneous, is certain to be modified in the circumstances of a later congress.

A sustained effort was made to find a general theme for this congress, sufficiently wide to include the many aspects of mathematical education which members would wish to consider but also presenting the ever-extending role of mathematics as an instrument of modern society and as a universal element in education. It was not possible to reach agreement on such a theme. Instead, speakers were invited to address plenary sessions of Congress on topics consistent with this view of mathematics. In addition it was decided to invite two of the most distinguished contributors to our knowledge of the learning of mathematics, Jean Piaget and George Polya, to give a message, in person or in writing, which would impart some initial direction to the proceedings.

Although an increase in the number attending could not be expected at each succeeding congress it seemed desirable for the committee to aim at a larger attendance than at Lyon and thus make the gathering more truly

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[†] Chairman of the Programme Committee of the Exeter Congress.

international and enlarge its influence. Exeter University had accommodation for more than a thousand people and on this basis a campaign of wide publicity was started. Information was sent to many kinds of educational institutions and professional associations; their help was sought in sponsoring individuals and arranging travel facilities for their members, as well as initiating the preparation of material for the working groups. Governments were approached to ask them to encourage adequate representation of mathematical education in their own country and to give any possible financial aid, especially to indi-·viduals who had been invited to take some part in the work of the Congress. This was helpful in developing countries where funds were not easily found.

The committee felt very strongly that a conference on mathematical education should have some more practical items on its programme than lectures, discussions, and exhibitions of books and equipment. Education is a process and has end results; strong arguments were advanced to the committee for showing both the process and some of the results in context. Since education is organised nationally, the proposal to include national presentations in the Congress programme was accepted as a practical means of bringing to Exeter samples of learning procedures and of what has been learned. But here the committee found organisational problems. Proposals from various countries differed so widely that it was impossible to prescribe common limits.

The host country was able, through the generosity of Local Education Authorities and the hard work of many teachers and helpers, to include in its presentation parties of children working on various topics and in different types of class organisation. Other proposals ranged from a massive expository programme to a small collection of characteristic indigenous patterns, studied mathematically, sent from Africa. The interest of the presentations which were actually contributed fully justified the scheme and it is possible that further experiments of this kind will be seen at future conferences. However it must be recognised that long preparation, early approval of any national proposal and a firm set of conditions under which the committee can accept a proposal are absolutely essential. The work of the committee was much lightened and made more effective by close co-operation with the parallel committee appointed to deal with such local affairs as the internal arrangements within the University and the planning of visits, excursions, and social events. The feasibility of the many events on the programme was thus assured. Not only the accommodation, equipment and facilities for formal sessions had to be precisely planned (e.g. the languages to be included in the instantaneous translation system)

but also the type of accommodation needed by groups and the language problems they involved had to be considered. At Exeter we were able to enlist language students from the University to help some members from overseas to settle in. But in a working group, interpreters with a knowledge of mathematics were needed for several contingents. This provision requires more organising than the Exeter committee had foreseen.

In the complexities of providing for a residential, international, academic conference it was easy to forget some of the social requirements e.g. the display of the Congress 'address' of each member; making enough rooms available for informal meetings of participants living in different units; giving effective notice of changes or new events in the programme; arranging for all the office services which become necessary. Such needs have to be faced well in advance of the opening day; they are vital for the communications between participants, which may be the most productive factor in the whole enterprise.

The experience of the committee responsible for planning ICME 1972 convinced its members that the true success of the Congress would depend on the contributions which participants would bring with them, in papers for preliminary reading or in questions to be posed. The organisers could provide the setting and the opportunities; it is in the sharing of noteworthy experiences and the debate on crucial questions that memorable ideas and clearer insights are generated. For this to happen, intending participants must receive early notice of the demands that Congress will make upon them and the range of topics to be presented. The Exeter committee was constantly aware of the pressure of time and of how much needed to be done at once - making decisions, securing helpers, sending out information under many related headings, etc. Early and imaginative preparation is an essential factor in a successful congress, to which one should perhaps add good humour and good fortune. May the 3rd ICME be outstandingly successful!

III COLLOQUIUM ON "EVOLVING A MATHEMATICAL ATTITUDE
IN THE SECONDARY EDUCATION
/AGE RANGE 14-18 YEARS/"

18-22, August, 1975, NYIREGYHÁZA

János Surányi †

The Colloquium was organized by the Bolyai János Mathematical Society from 18th to 22nd of August at Nyiregyháza/Hungary. It counted 139 participants, 54 of them from abroad. They represented 17 countries from four continents.

There were 13 one hour lectures presented by:

A. W. Bell (Great Britain)
"Stages in generalisation and proof"

A. J. Bishop (Great Britain)
"Opportunities for attitude development within lessons"

P. Buisson (France)
"Evaluation de différents niveaux d'acquisition de certaines notions par des élèves de 13, 14 et 15 ans"

T. Fletcher (Great Britain)
"Ways of improving mathematical attitudes"

H. Freudenthal (Netherlands)
"What is a mathematical attitude?"

K. Härtig (German Democratic Republic)
"Different kinds of teaching logics"

S. Iyanaga (Japan)
"An account on children's attitude in a school studying geometry /age 12/"

S. Klein (Hungary)
"What is a mathematical attitude from the point of view of the psychology?"

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Z. Krygowska (Poland)
"Généralisation et spécification dans l'enseignement de la mathéma-
tique au niveau secondaire"

J. Sedivy (USSR)
"Mathematical course based on a didactic sequence of set concepts"

R. Stowasser (Federal Republic of Germany)
"Problem fields in geometry with number-theoretic results"

J. Surányi (Hungary)
"Developing function concept in secondary school"

T. Varga (Hungary)
"Subject matter and approach: their relationships"

and 14 half-an-hour lectures presented by:

M. Barner (Federal Republic of Germany)
"Analysis Unterricht in BRD"

J. Bognár - T. Nemetz (Hungary)
"On the teaching of probability at secondary level"

A. M. Bartal - J. Pálfalvi (Hungary)
"Developing the problem solving capacity of pupils by working sheets
within teaching mathematics in grammar schools"

G. Delande (Belgium)
"Un point de vue belge sur l'enseignement de la mathématique aux
enfants de 14 à 18 ans"

L. Dereljev (Bulgaria)
"Learning the elements of mathematical logic in secondary school"

I. Halmos (Hungary)
"Development of the concept of real numbers"

E. Korányi (Hungary)
"Undoing inhibitions concerning math. learning"

M. Klakla (Poland)
"Quelques remarques sur l'étude des attitudes des élèves devant un
problème, comme noyau de connaissance de leurs aptitudes"

J. Major (Hungary)
"An experiment of the facultative teaching in Hungary"

D. N. Shopova (Bulgaria)
  "A method for the introduction of the real numbers as a tool to
  mathematical way of thinking"

M. Siwek (Poland)
  "An information on the theme: how pupils understand implication"

E. M. R. Smith (Great Britain)
  "Factors affecting attitudes toward mathematics"

S. Turnau (Poland)
  "Scheming mathematical proofs"

Gy. Szánthó (Hungary)
  "The possibilities of deeping the abstraction with problems, connect-
  ing the various chapters of mathematics"

The lectures were simultaneously interpreted in English, French, Russian and
Hungarian languages.

One part of the lectures examined the nature of the mathematical attitude in
general by seeking the answers for fundamental questions as e.g. What is a
mathematical attitude? What kind of components does it contain? How can
its development be measured?

Some of the others dealt with the possibilities of developing such an attitude
on special fields of school mathematics as sets, the concept of real numbers,
functions, logics etc.

A third part of the lectures discussed methods promoting the development of
pupils' mathematical attitudes.

A volume containing a selection of the lectures and discussions is foreseen
to be published within the year 1976 in cooperation by the Bolyai János
Mathematical Society and the Reidel Publishing Company.

IV   INTERNATIONAL SYMPOSIUM ON

COMBINATORICS AND PROBABILITY

IN PRIMARY SCHOOLS

25-28, August, 1975, WARSAW

Zbigniew Semadeni [†]

The ICMI symposium "Combinatorics and probability in primary schools" was held in Warsaw, 25-28 August 1975, organized by the Polish national subcommittee of ICMI.

The subject of the symposium is a field which hardly existed 15 years ago. In recent years many successful experiments with children from age 6 on have shown that such a topic in primary schools of future is possible. Its growing importance follows from the significance of bringing up children to think in probabilistic, not only deterministic, terms.

A success of the symposium should be noted: almost all people who have created this new part of didactics of mathematics were able to come to Warsaw.

There were 82 participants to the symposium /including 31 participants from abroad/.

The list of invited papers reads as follows:

Hans Freudenthal /Utrecht/ - "Children observed"

Frédérique Papy /Brussels/ - "Situation combinatoire et probabiliste"

Georges Papy /Brussels/ - "Un jeu probabiliste à l'école primaire"

Arthur Engel /Frankfurt/M/ - "The probabilistic abacus"

Guy Brousseau /Bordeaux/ - "Quelques problèmes d'enseignement des probabilités et de statistiques à l'école primaires"

Tamas Varga /Budapest/ - "The Hungarian approach to probability in primary grades"

[†] Polskiej Akademii Nauk, Chairman of the Organizing Committee of the Symposium.

Maurice Glaymann /Lyon/ - "Les probabilités à l'école élémentaire; travaux de l'équipe de Lyon"

Stefan Turnau and Anna Zofia Krygowska /Cracow/ presented a mutually complementary pair of lectures: "Combinatorial reasonings: what they do develop ... et ce qu'ils ne développents pas".

There were also shorter papers:

F. Goffree and J. van den Brink /Utrecht/ - "Certainty impossible: mathematising the field of co-incidence and chance"

Z. Semadeni /Warsaw/ - "Two examples concerning combinatorics teaching"

L. Råde /Gothenburg/ - "Some remarks on the probabilistic abacus"

S. Vukadinović /Belgrade/ - "Les notions fondamentales de la statistique mathématique dans les écoles primaires comme les illustrations et les exemples des notions et des éléments de la mathématique classique"

S. Stojanović /Belgrade/ - "Elements of probability and statistics in primary school"

R. Stowasser /Bielefeld/ - "Reizvolle Zugänge zu kombinatorisch-zahlentheoretischen Sachverhalten".

Manuscripts of papers not previously published are mimeographed. A copy is sent to each participant and to each national subcommittee of ICMI. Further copies are available from the Polish subcommittee of ICMI.

From August 29 to August 31 there was a Round Table on Teaching of Statistics with Prof. L. Råde as the chairman. It was a continuation of the ICMI symposium with a much smaller group of people. One of the goals of the Round Table was to write a report to be published by the ISI Educational Program.

V   THE FIRST PAN-AFRICAN CONGRESS OF MATHEMATICIANS

H. Hogbe-Nlend [†]

The first Pan-African Congress of Mathematicians will be held at Rabat (Morocco) from 26 to 31 July, 1976, under the auspices of UNESCO and IMU. It is hoped that it will be organized in close cooperation with ICMI in every appropriate form.

The general theme of the Congress is "The mathematics and the development of Africa"; its programme consists of two parts:

(1) Mathematics proper, with priority to the fields closely related to other sciences and engineering, such as:

— Partial differential equations and inequations and functional analysis
— Fourier analysis and representation theory
— Lie groups and analysis on varieties
— Numerical analysis
— Control theory
— Automatics
— Probability and statistics
— Mechanics
— Biomathematics
— Econometrics.

(2) Scientific policy.

1° Mathematical education in Africa
(a) Pre-university education (structure, curricula, deplomas)
(b) Higher education (conditions of admission; organization of studies and examinations; mathematics for engineers; mathematics for other sciences: economy, medicine, pharmacology, social sciences and humanities)
(c) Recognition of mathematical studies and diplomas between African universities.

2° Creation of a Pan-African Mathematical Center intended to be center of formation of leading mathematicians; center for scientific meetings and for advanced mathematical researches.

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3° Creation of African Mathematical Union.

4° Problems on scientific cooperation between Africa and other continents principally in the domain of mathematics.

Further informations may be obtained from:
> Secretariat of the Organizing Committee
> c/o Faculty of Science of Rabat
> Avenue Moulay Cherif, Rabat (Morocco).

VI   ON REGIONAL CONFERENCE ON DEVELOPMENT OF
INTEGRATED CURRICULUM IN MATHEMATICS FOR
DEVELOPING COUNTRIES IN ASIA (India)

Professor P. L. Bhatnagar, Convener of the Conference communicated that:

(a) The dates of the Conference were changed to December 15-20, 1975, both days included.

(b) As of August 1975, the following countries have accepted to participate in the Conference: Afganistan, Bangladesh, Iran, Malaysia, Singapore, Srilanka.

VII   PUBLICATION OF THE PROCEEDINGS OF THE
ICMI-JSME REGIONAL CONFERENCE IN TOKYO

Shigeru Shimada †

The Proceedings of the ICMI-JSME· Regional Conference on Curriculum and Teacher Training for Mathematical Education, which was held in Tokyo on 5-9 November 1974 and reported in No.4 of this Bulletin, has been published in August 1975 by the Japan Society of Mathematical Education as a special issue of "Report of Mathematical Education", one of its official journals. The price of a single copy of the Proceedings is US$18.00, which includes costs for postage by surface mail and handling, and copies are available from the following by order with remittance.

> The Secretary
> Japan Society of Mathematical Education
> c/o Tokyo University of Education
> 29-1 Otsuka 3-chome, Bunkyo-ku, Tokyo
> 112 Japan.

Remittance should be made through mail transfer advice and payable to:

> Nihon Sugaku Kyoiku Gakkai
> Kyowa Bank, Myogadani Branch, Account No. 140942.

The proceedings contains in its total 272 pages all the lecture texts of invited speakers, Prof. M. H. Stone, Dr. A. G. Howson, Academician S. L. Sobolev, Prof. A. Lichnerowicz, Mr. J. Vanniasingham, Prof. Dr. H. G. Steiner, and Prof. Y. Akizuki, and papers presented in the Working Groups (10 papers in the Working Group A "Mathematics in Primary School", 9 papers in the Working Group B "Mathematics in Secondary School", 9 papers in the Working Group C "Preparing Teachers of Mathematics in Training Institute", 8 papers in the Working Group D "Inservice Training", and 8 papers in the Working Group E "Educational Technology in Mathematical Education"), together with brief outlines of discussions related with the invited lectures and the presented papers. It also includes a summary of what the participants saw and heard in schools and institutes where they visited during the Conference as a part of the program.

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† Secretary of the Organizing Committee of the Conference, National Institute for Educational Research, Meguro-ku, Tokyo.