ICMI

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The International Commission on Mathematical Instruction

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Legend: IMU stands for *The International Mathematical Union*; ICSU stands for *The International Council of Scientific Unions*; CTS stands for *The Committe on the Teaching of Science* (of ICSU).

REMARKS BY THE EDITOR

In connection with the election of the new ICMI Executive Committee 1991 -1994, new Officers were appointed in succession to Jean-Pierre Kahane as President, Emilio Lluis as Vice- President and Geoffrey Howson as Secretary. New Members were elected to succeed Hiroshi Fujita, Jermey Kilpatrick and Mogens Niss, and new Ex-officio Members were elected to succeed Ludvig Faddeev and Olli Lehto.

In his welcoming message published in the last issue (No. 29) of this Bulletin, the new President, Miguel de Guzmán, took the opportunity to thank very warmly the previous Officers in particular and the Executive Committee in general for the work they have done for ICMI. As the new Secretary it is my pleasure to fully endorse Miguel de Guzmán's thanks. I should like to add my personal thanks to my predecessor Geoffrey Howson who after two terms as Secretary wanted to retire from the post and from the Executive Committee. The task of succeeding Geoffrey Howson, whose enthusiasm, working capacity and enormous international network of colleagues and friends are legendary, certainly is a bit frightening. I can only hope that some of the many lessons there have been to learn from him, in his handling of ICMI's affairs, will materialise in the present term as well.

One implication of the change of Officers is that the Secretariat of ICMI has now been moved to Roskilde University, Denmark. Another implication is that from this issue onwards the Bulletin will be edited by the new Secretary and distributed from the new Secretariat. The competence and efficiency with which the editors during eight years (beginning in 1983 with No. 13 and finishing with No. 29), Keith Hirst and Geoffrey Howson of the University of Southampton, deserve our highest praise. They have succeeded in making the Bulletin a most valuable source of information and a forum for exchange of views significant to the mathematics education community. In (at least) one respect, future issues of the Bulletin inevitably will display a decrease of quality: The language of the articles written or edited by the editor will ressemble correct – let alone idiomatic – English only incidentally. To make the

production of the Bulletin sufficiently flexible and inexpensive it will not be possible, in general, to have the language of the articles checked by someone whose mother tongue is English. We hope to be granted indulgence by those whose mother tongue *is* English and sympathy by those who share with us the disadvantage of having a different first language.

In the future as in the past there will be no copyright of material published in the Bulletin. On the contrary, National Representatives, officers of mathematics education associations, editors of journals etc. are encouraged to reproduce articles as well as news, announcements and other sorts of information as they feel appropriate.

The Bulletin lives and prospers only on the material it publishes. I is therefore my pleasure to conclude by inviting all readers to submit, or in other ways procure, articles, news or announcments which they consider it relevant to share with the mathematics education community of the world.

Mogens Niss

ICMI AND ITS RELATIVES

by Mogens Niss

Although, of course, most of the readers of this Bulletin know something about ICMI it is not certain that the system of which ICMI is a part. nor the types of activity ICMI undertakes, are all that well known to the general readership.

ICMI in context

The *International Commission on Mathematical Instruction* was first established at the International Congress of Mathematicians in Rome 1908 on the suggestion of the American mathematician and historian of mathematics, David Eugene Smith. (For a survey of the history of ICMI, see the very informative article by A.G.Howson in Educational Studies of Mathematics, 15 (1984), 75-93). The first President of ICMI was Felix Klein and the first Secretary-General was Henri Fehr. From the very beginning, *L'Enseignement mathématique*, founded by Henri Fehr in 1899, was – as it still is – the official organ of ICMI.

As the *International Mathematical Union (IMU)* was created after the Second World War ICMI was reconstituted (1952) as a Commission belonging to and appointed by IMU. This defines the formal position of ICMI also today. Furthermore, a substantial percentage of the funding of ICMI comes from IMU.

As a scientific union IMU is a member organisation, along with nineteen other scientific unions, of the *International Council of Scientific Unions (ICSU)*. This implies (among other things) that ICMI, through IMU. is to abide to the ICSU statutes one of which establishes the principle of non- discrimination. This principle affirms the right and freedom of scientists to associate in international scientific activity regardless of citizenship, religion. political stance, ethnic origin, sex and suchlike.

The structure of ICMI

As to ICMI as such. the Commission is defined by two components: One

component is the *Executive Committee (EC)*, the other consists of the *National Representatives*, one from each nation which is a member of ICMI. In addition to IMU countries which are automatically members of ICMI, also non-IMU countries may, on certain conditions, be coopted as members of ICMI. They appoint National Representatives as well. Every four years a meeting of the *General Assembly* of ICMI – the union of the Executive Committee and the National Representatives – is held at the International Congress on Mathematical Education (ICME).

The Executive Committee consists of four officers, the President, two Vice-Presidents and the Secretary, and of three further members. In addition, the outgoing President of ICMI, the President and the Secretary of IMU, and the representative of IMU on the *Committee on the Teaching of Science (CTS)* of ICSU are members ex-officio of the EC.

For the time being the National Representives on ICMI represent 60 countries from all parts of the world.

In quite a few countries national *Sub-Commissions* of ICMI have been established with the dual purpose of providing an organised forum for dealing with issues of mathematics education at a national level and of offering an interface between that level and the international mathematics education community represented by ICMI. In cases where a national Sub- Commission exists the National Representative on ICMI is appointed by the Sub-Commission. Normally the National Representative is the chairperson of the commission.

Study groups affiliated to ICMI

During the past two decades three permanent so-called *study groups*, each devoting its attention to a specific theme or topic area, have been affiliated to ICMI. These study groups are the following:

The International Organisation of Women and Mathematics Education, IOWME

The International Study Group for the Relations between the History

and Pedagogy of Mathematics, (ISGHPM)

The International Group for the Psychology of Mathematics Education, (PME).

In addition to meeting in connection with the ICMEs the affiliated groups hold separate meetings on a more or less regular basis.

The names and addresses of the officers of these groups, as well as information of some of their future meetings, can be found elsewhere in this issue of the Bulletin.

ICMI activities

ICMI undertakes its more substantial tasks by involving itself in, essentially, three different types of scientific activity, as follows:

The ICMEs

A major event in the life of the international mathematics education community is formed by the quadriennial *International Congress on Mathematical Education, (ICME).* So far six congresses have been held in different parts of the world (in Europe, America and Australia). In recent congresses attendance was about 2000 participants. The latest was ICME 6, Budapest 1988, the next will be ICME 7 in Québec, Canada, August 1992.

For each ICME, the scientific programme is planned by an International Programme Committee appointed by – and including representatives of – the ICMI Executive Committee, whereas the organisational aspects are taken care of by a Local Organising Committee. As each congress presents enormous amounts of research, investigations, ideas, materials, etc., normally a host of different publications having a specific focus and being based on congress work are published in addition to the Congress Proceedings proper.

ICMI studies

In recent years, ICMI found it important to involve itself in identifying

issues or topic areas of particular current significance to mathematics education and to invest effort in mounting specific studies on these themes. The emphasis of a given study may be on analytical or action-orientated aspects, but an analytical component should always be present.

Although no strict, uniform scheme has been adopted for the studies, it seems fair to present the following scheme as 'typical':

After having decided to mount a study on a particular theme, the ICMI EC appoints an international Programme Committee (PC), usually with rather few members.

The task of the PC is first of all to write a so-called *Discussion Document* in which key issues related to the theme under consideration are identified, presented and discussed in a preliminary way. The Discussion Document is then published internationally in journals etc., including *L'Enseignement mathématique* and this Bulletin, and readers are invited to react in writing to the PC.

The next step is for the PC to invite a limited number of individuals to take part in an invited *study conference* the goal of which is to create a working forum for investigating the theme of the study assisted by the inputs provided by the Discussion Document, a collection of working papers (mainly written by participants), and presentations delivered at the conference. This study conference, too, is organised by the PC.

The last step is to write/edit *study publication(s)* on the basis of the written documents and the work done at the conference. The study which is included in the ICMI Study series may take different shapes depending on the character of the theme dealt with. The format ranges from a collection of selected papers to a comprehensive exposition. The writing and editing of the study is taken care of by members of the PC under the editorship of the President and the Secretary of ICMI.

Up till now 5 studies have been published – by Cambridge University

Press which company, by the way, is not going to publish them in the future:

- *School Mathematics in the 1990s*, 1986
- *The Influence of Computers and Informatics on Mathematics and its Teaching*, 1986
- *Mathematics as a Service Subject*, 1988
- *The Popularization of Mathematics*, 1990
- *Mathematics and Cognition: A Research Synthesis by the International Group for the Psychology of Mathematics Education*, 1990

(For a discussion of these studies see a forthcoming article by Bernard Hodgson ('Regards sur les Études de la CIEM') to appear in L'Enseignement mathématique.)

In April 1991 a study conference on *Assessment in Mathematics Education and Its Effects* was held. The publication resulting from that conference will be the next study to appear in the series.

A study on *Gender and Mathematics Education* is being planned at the moment. Further information on this study is given elsewhere in this issue of the Bulletin. The study conference is scheduled for 1993.

Regional meetings

Although, almost by definition, ICMI operates at a global level, some aspects, issues and problems related to mathematics education are more prevalent in some parts of the world than in others. One obvious example among many is 'language'. Many people seriously involved in research and development or innovative practice of mathematics education are not familiar with English to an extent that makes them feel at ease in a context where English is the dominant language as is generally

the case with international conferences. Another elementary problem is, of course, 'money'. As we all know, the financial opportunities of attending conferences held far away from one's home town are not evenly distributed over the globe.

Against this background, ICMI has been involved in various ways – in programme activities or as a sponsor – in a number of *regional conferences*, mainly in Southeast Asia, Latin America and Africa.

Conclusion

The picture of ICMI brifely outlined above necessarily is a static one as it emphasises what has been done and what is being done for the time being. However, ICMI rather sees its task as a dynamic one. ICMI should not just reflect and react to changes in the world of mathematics education but also take measures to shape and improve mathematics education in a pro- active way. Hence, ICMI is continuously working on developing the spectrum of its activities. For this not to be done in 'splendid isolation'. the EC would greatly welcome any comments and suggestions regarding ICMI's past and future activities.

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NATIONAL SUBCOMMISSION OF BELGIUM

The National Subcommision of Belgium has recently been reformed in both its status and its composition. It has been acknowledged, with the name of **ICMI-BELGIUM**, as a subcommission of the National Committee of Mathematics (NCM) of Belgium which is the representative of the International Mathematical Union, IMU. Thus, the position of ICMI-BELGIUM is now similar, on the national level, to the position and relationships of ICMI with IMU on the international level. The members of the NCM being appointed by the National Academy of Sciences in Belgium, the existence and composition of ICMI- BELGIUM has been approved by the Academy.

The composition of ICMI-BELGIUM reflects the cultural duality of the country; the French speaking and Dutch speaking communities are each represented by four members. Moreover, the NCM has its representative as well. Presently the members of ICMI-BELGIUM are:

Gontran Ervynck (Kath. Univ. Leuven), National Representative of Belgium on ICMI, *Chairman*
Claudine Festraets (Ath. Royal Woluwé-St.Pierre), *Vice-Chairman*
Nicolas Rouche (Univ. Cath. Louvain), *Representative of the NCM*
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Dirk Janssens (Kath. Univ. Leuven)
Maggy Schneider (Fac. Univ. Namur)
Gilberte Schuyten (State Univ. Ghent)

It has been agreed that the composition of the Subcommission will be revised every four years, after the ICMI congress.

The work of the Subcommission is supported by a group of about 40 mathematics teachers and researchers in mathematics education.

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ICMI STUDY:
Gender and Mathematics Education

The next study to be conducted in the series of *ICMI Studies* will be devoted to *Gender and Mathematics Education.* A Discussion Document prepared by the Programme Committee (**Gila Hanna**, Canada; **Geoffrey Howson**, UK; **Hans-Georg Steiner**, Germany; **Heleen Verhage**, The Netherlands. **Mogens Niss** is a member ex officio) is under preparation. It will be published in a forthcoming issue of this Bulletin. A brief outline of the study is presented below.

Brief Outline

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

The specific objectives are:

1. To review and examine critically present positions on gender and mathematics education;

2. To exchange information concerning research, policies and practices;

3. To investigate promising future directions for research and promote international cooperation.

This study arises from a series of discussions between members of the International Organisation of Women and Mathematics Education (IOWME) and the International Commission on Mathematical Instruction (ICMI). In these discussions, the lack of dessimination of information and research findings in the area of gender and mathematics

education emerged as a concern and it was felt that an ICMI study would provide a forum both for scholarly discussion and collaboration among researchers and practitioners. The following areas are proposed for discussion:

1. Explanatory models of gender differences: factors associated with the learner (cognitive and psychosocial); factors associated with the environment (social, cultural and educational).

2. Content and form of the mathematics curriculum: views on the nature of mathematics, syllabi, learning and teaching styles, assessment practices.

3. Research: lessons learned and future directions.

4. Strategies for change: existing intervention programs and their perceived effectiveness.

The following background paper to the study has been written by Gila Hanna and Gilah Leder:

An ICMI Study on: Gender and Mathematics Education. Research Background

by Gila Hanna and Gilah Leder

The consequences of differences in participation rates of males and females in mathematics and science subjects are far- reaching. A lack of mathematical qualifications is commonly used as a barrier to apprenticeships, further training and tertiary courses. Girls, more often than boys. cut themselves off from from further educational opportunities and career choices because they avoid mathematics courses when they are no longer compulsory. The need to enhance our understanding of why this avoidance occurs so that more equitable educational outcomes can be achieved is the main theme of the proposed conference.

Current studies indicate that the relative length of time that boys and girls remain in school is not a factor in the reduced presence of females in mathematics and sciences at the tertiary level. Indeed, recent years have seen an increased tendency for more females than males to stay in school until the end of the secondary program. The anomalies appear in the retention of mathematics and science courses at the secondary school level. In the United States and Canada, fewer females than males enrol in mathematics courses such as advanced algebra, precalculus and calculus. Fewer females than males take A-level mathematics courses in the United Kingdom; fewer females than males continue with intensive and advanced mathematics courses in Australia. At the tertiary level in Canada, where 50 percent of the students are female, only 27 percent of those enroled in undergraduate mathematics and science courses are female; in engineering, the enrolment of females is a mere 12 percent.

Over the past two decades, researchers have shown considerable interest in the relationship between gender and the mathematics achievement in the upper grades of elementary school. Research findings have not been consistent, and some controversy surrounds the analysis and interpretation of the data. International studies have shown that gender related differences in achievement vary considerably both within and among countries. When gender related differences in achievement are present they are rather small and cannot account for the discrepancies in enrolment in higher level mathematics courses.

Early attempts at explaining gender differences looked at biological differences between the sexes and focused on hormones, genes, and brain organization. More recently, research teams have proposed theoretical models which include a number of factors such as the curriculum, the situation, the environment and participation in mathematics related courses. The literature on sex differences has also considered the possibility that male mathematics superiority is due to psychological processes such as stereotyped sex role identifications and social reinforcement contingencies.

Contemporary Thinking on the Problem

The following sketch summarizes contemporary thinking and recent explanatory models. These fall under the categories of the school, the teacher, the peer group and the learner. The research areas, stemming from each cluster of variables, will be the main foci of conference discussion.

The School and the Teacher

There are a number of ways in which schools, and teachers within the schools, differentiate between students on the basis of gender. The schools do so through their organizational procedures, the teachers through their behaviours, expectations and beliefs. Until recently, gender segregated education has been viewed as an anachronism reflecting the outmoded belief that males and females have different educational needs. Coeducation was assumed to be the avenue through which similarity of treatment could be achieved, while sex segregated school settings were considered to be a measure of the extent to which boys and girls were believed to require different preparations for different adult roles. The extensive amount of research evidence that coeducation does not signify equity or equality in policy or practice has brought about a re-examination of this assumption.

Various schools and system level interventions aimed at improving the learning climate for girls have experimented with single sex settings. Collectively, these settings suggest that carefully timed, organized and implemented programs may indeed lead to qualitative if not quantitative benefits in mathematics education for some girls. They have highlighted the subtle ways (includings time-tabling decisions, curriculum selection, counsellors' advice, and administrators' advocacy of certain instructional policies) in which girls may be disadvantaged in a coeducational setting.

It should be stressed that the research evidence to date does not warrant unreserved advocacy for the adoption of long term gender segregated mathematics classes. While some researchers have argued that girls studying mathematics and science seem to be disadvantaged in a

mixed school setting, others have reported that girls in coeducational schools performed at least as well in mathematics as those in single sex schools. Reference to students' reflections about their experiences in segregated and coeducational classes highlights the importance attached by students to having close friends in their class, irrespective of gender arrangements. Other researchers point out possible consequences of segregated education which may not result in changing largely male-centred curricula in mathematics and science, or have any positive influence on the attitudes of male students, teachers and schools towards girls. Another factor which cannot be ignored is the effect of parents' educational and occupational level on their children's mathematics learning in both segregated and non-segregated settings. Most of the studies which have examined the appparent benefits or disadvantages of long term education in a gender segregated environment have not controlled adequately for this factor.

However, whatever formal organization of the mathematics lessons, teachers play a vital role in carrying out school policies. Earlier research had indicated that teachers often interact differently with their male and female students, generally to the advantage of male students.

The Peer Group and the Learner

The peer group acts both in school and in society at large as an important reference for childhood and adolescent socialization and further perpetuates gender role differentiation through gender typed leisure activities, friendship patterns, subject preferences and career intentions.

The preference of boys for active games and hobbies based on physical skill and the mastery of objects and of girls to use play to practise skills related to interaction and interpersonal relationships has frequently been documented, and conforms with adult expectations. It has also been argued that females differ in the areas in which they strive or are expected to aim for success. While males favour achievement in the traditionally highly valued areas of intellectual expertise and leadership skills, females are considered more likely to aim for excellence in areas congruent with their traditional roles, that is, areas that require

social skills. Thus the branding of mathematics as a male domain has often been used to explain girls' lower performance and participation in optional mathematics courses. Minimizing stereotypes, increasing exposure to a wide range of ideas, experiences. and models, teaching the skills of decision making, problem solving, and evaluation, and providing experiences conducive to self- differentiation and self-knowledge are strategies advocated by several researchers to minimize the constraining effects of sex role on cognititve functioning.

Differences in leisure time activities and particularly in attitudes towards mathematics are reflected in the career expectations of boys and girls. Occupational aspirations indicate that competence in mathematics is a more important prerequisite for the attainment of boys' career ambitions than it is for girls. In a number of studies, this view is expressed explicitly by boys and girls. More generally, it has been argued that society's sex role ideology and concomitant life structures enable men to select mathematics as a meaningful activity and to pursue it as a career whereas it deflects women away from mathematical pursuits. The pervasiveness of such beliefs is illustrated by American and English as well as by Australian data.

The gender differences in peer group values outlined above are reflected in students' beliefs about their own performance and long term expectations. One noteworthy finding that emerged from research studies was that boys in grades 6 through 12 consistently showed greater confidence than girls in their ability to learn mathematics. Initially, these feelings were not reflected in differences in achievement. However, among older students, confidence in mathematics was a good predictor of performance for girls but not for boys.

The fear of success construct was postulated in an attempt to explain gender differences in studies that explored achievement motivation. Because of Western culture's assumption that attainment of success in certain areas is more congruent with the male than the female role, attainment of success by females in these areas may be accompanied by negative consequences such as unpopularity, guilt. abuse or doubt

about their femininity. The prediction that success in mathematics, an area typically stereotyped as a male domain, may evoke ambivalence or anxiety about success, particularly among the most able, achievement-oriented females, has received research support. The findings in this area are consistent with the research on the lack of confidence expressed by girls in their ability to do mathematics, their uncertainty about the appropriateness of doing mathematics and ultimately their lower performance in mathematics. Studies such as these suggest that girls' lower performance in mathematics is a function not so much of ability as of expectation which girls internalize and conform to as a standard for their behaviour.

Closely related to the work on fear of success are studies that consider attributions of success and failure on certain tasks. Those who have concentrated on accounts of success and failure in a mathematics setting have reported that females provide less functional accounts of their success than males. For example, one indicator of the female fear of success imagery is the feeling that a woman has to work harder than a man to have achievements recognized. This feeling is echoed in the tendency of females to attribute success to effort compared to the tendencey of males to attribute it to ability. This finding, together with its converse, namely that males tend to attribute failure to lack of effort whereas females tend to attribute it to lack of ability, reflects a pattern of attributions most likely to lead to cognitive, motivational and/or emotional deficits.

Some Intervention Models

The almost total absence of women in science means that one- half of the population finds its options limited. This is not only a problem of job equity, but also a problem of the efficient use of human resources. The present need for the expansion of scientific activity makes it imperative to search for highly qualified personnel among the untapped human resources of the entire population. Awareness of these two issues has led school boards, universities, government agencies and professional associations to develop programs which help women pursue their education in the areas of mathematics and science.

REFERENCE

A bibliography of relevance to this study, to be published by UNESCO, is the following:

Research on Gender in Mathematics, Science and Technology:
An Annotated Bibliography 1980 – 1990

by **Gila Hanna and Karin Mertins**,
The Ontario Institute for Studies in Education,
Toronto, Canada

ICME 8, 1996: Sevilla, Spain

It is a pleasure for the Executive Committee of ICMI to announce its decision about the venue for The Eighth International Congress on Mathematical Education (ICME 8) which is to be held in 1996. The Executive Committee was happy to accept the bid from Spain to host the congress in **Sevilla**. Most probably the congress will be held in August.

ICME 9, 2000: First call for bids

At the turn of the millennium, in the year 2000, it will be time to hold the Ninth International Congress on Mathematical Education (ICME 9). The Executive Committee has the pleasure of inviting countries which might be interested in hosting ICME 9 to begin already now to consider preparing bids.

The decision about the venue and dates of ICME 9 will not be made in the near future. However, assuming that several countries might consider it particularly attractive to host in year 2000 the most prestigious event in international mathematics education, the Executive Committee felt that countries should be given ample time to prepare their bids. This announcement is only a first call for bids, and no deadline for the submission of bids has been set yet.

CONFERENCES

BCME

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

Further information can be obtained from:

Marion Keeling
BCME Bookings
7 Shaftesbury Street
Derby DE3 8YB
UK

ICTMA 5

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

Further information can be obtained from the Chairman:

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

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

ISGHPM

There will be a meeting of the *International Study Group on the Relations Between History and Pedagogy of Mathematics*, in Toronto on August 9 – 13, 1992, just before ICME 7 in Québec. Contact person:

V. Frederick Rickey
Department of Mathematics and Statistics
Bowling Green State University
Bowling Green, OH 43403
USA

ICME 7

The 7th international Congress on Mathematics on Mathematical Education will take place on August 17 – 23 1992 at Université Laval, Québec, Canada.

The Second Announcement is now available. Congress address:

Congrès ICME-7 Congress
Université Laval
Québec, QC G1K 7P4
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PUBLICATIONS

Training Teachers to Teach Statistics

In the No. 29 issue, December 1990, of this Bulletin a book to appear with the above title, edited by Anne Hawkins, was mentioned. Since then the book has been published by

The International Statistical Institute (ISI)
428 Prinses Beatrixlaan, P.O.Box 950, 2270 AZ, Voorburg
The Netherlands.

The book - which represents the proceedings of the ISI Round Table Conference held in Budapest, July 1988, and contains contributions by about 30 people from many different countri- es - is available from the ISI. The price is US$ 30.00, SF 41, UK£16.70, FF 185, DM 49, DFl 55. Payment should be made by a cheque made payable to the ISI.

National Curricula In Mathematics

The *Mathematical Association* (252 London Road, Leicester, LE2 3BE, England) has recently published *National Curricula in Mathematics* (pp. 238). This book has been prepared by **Geoffrey Howson** and comprises detailed descriptions of the school structures and national curricula of the 12 EC countries, Hungary and Japan, plus three introductory chapters.

This book can be ordered from the Mathematical Association, price £ 5.50 (paperback including surface mail), £ 15.50 (hard back). For airmal please add: Europe £1.30, Zone 1 (world except Australia, Far East) £ 3.80, Zone 2 (Australia, Far East) £ 4.27, for each paperback copy. Add a further £ 1 to these supplements for hardback airmail. Please send money orders in pounds sterling or, alternatively, add £ 3 to cover bank costs if paying in local currency.

MATHEMATICS COMPETITIONS: A STIMULUS FOR POPULARISING MATHEMATICS

Please note that the author of the above article which appeared in Bulletin 29, December 1990, was

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