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ICMI News 10 : June 2009

- Extra-muros -

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ICMI News 10 : June 2009

A Bimonthly Email Newsletter from the ICMI-International Commission on Mathematical Instruction Editor : Jaime Carvalho e Silva, Dep. Matematica, Universidade de Coimbra, Portugal

CONTENTS

1. Editorial : Mathematics Education in East Asian Countries

In the last issue of this Newsletter, Kumaresan talked about the issues and problems faced by India in mathematics education. Coming from East Asia, perhaps I should briefly talk about issues concerning mathematics education in East Asia. These descriptions and discussions reflect the truly international nature of ICMI. I will however be tackling the topic following an approach totally different from that adopted by Kumaresan.

There are quite a number of countries which may be considered as being in East Asia, but here I will confine myself to those countries or systems which are under the influence of the Confucian Heritage Culture (or CHC), namely China, Hong Kong, Japan, Korea, Singapore and Taiwan. Interest in the mathematics education of CHC countries has been aroused and intensified by the superior performance of CHC students in recent international studies of mathematics achievement such as TIMSS and PISA. Traditionally, student achievement was explained in terms of learner attributes and the quality of teaching, but the high achievement of students from these East Asian countries which share a common culture points to the necessity of understanding teaching, learning and achievement from the perspective of the underlying cultural values. In response to this, ICMI devoted a Study (Study 13) to discussing mathematics education in East Asia and the "West".

In the Study Volume of Study 13 and elsewhere, I have discussed the possible cultural values which may be used for explaining the high achievement of CHC students. These include,

- 1.   a strong emphasis on the importance of education and the high expectation for students to achieve,
- 2.   the examination culture,
- 3.   the role of practice and memorization in learning, and
- 4.   the pragmatic philosophy in CHC countries This is not the place to elaborate on these values, but in recounting the superior achievement of CHC students, one must not forget that in the literature, CHC students were also found to be situated in an environment that is not conducive to effective learning. CHC class size is often large, and teaching is typically very traditional and teacher centered with minimal student involvement. Students' attitude

towards mathematics is rather negative, and students are not confident in their mathematics ability. This is the so-called Paradox of the Chinese or CHC Learner. What can we learn from the discussion above and from the Paradox of the CHC Learner ? I will just mention two points here.

First, cultural factors are important determinants of student learning and achievement. The student is not a white sheet of paper waiting for the teacher to write knowledge onto. This realization is especially important for a subject such as mathematics, which is often considered a universal subject not affected by culture. The Paradox of the CHC Learner should remind us of the powerful cultural factors that are at work in student learning and achievement, often transcending the influences of other factors such as student ability and classroom instructional practices. Teachers should take the culture of the students into consideration in designing their instructional activities, and should capitalize on the favourable elements in students' culture(s) to promote learning.

Secondly, we need to view the high achievement of CHC students in the light of their negative attitudes towards mathematics. Some of these negative attitudes may also be explained by cultural factors, and the lesson to learn here is that we need to take into account the price that has been paid in achieving good results. The negative effects of a high expectation for students to achieve, the examination culture, and the stress on practice and memorization are surfacing. In Korea for example, many children attend private tutoring schools after their formal schooling, often until mid-night, and this has become an acute social problem. No wonder the attitudes of CHC students towards mathematics are so low !

In mathematics education, one should of course aim for good academic results. But a positive attitude towards mathematics should also be an important goal of mathematics education. The issues and problems faced by CHC countries in mathematics education should remind us that in education, it is important to strike a delicate balance.

Frederick.K.S. Leung, Member-at-large, ICMI-EC, The University of Hong Kong, frederickleung@hku.hk

2. The Klein Project

In 2008 IMU and ICMI commissioned a project to revisit the intent of Felix Klein when he wrote Elementary Mathematics from an Advanced Standpoint. That is, to produce a book for secondary teachers that communicates the breadth and vitality of the research discipline of mathematics and connects it to the senior secondary school curriculum. The international Design Team for the project met recently. The team confirmed the production of a 300-page book written to inspire teachers to present to their students a more complete picture of the growing and interconnected field represented by the mathematical sciences in today's world. We expect this will be backed up by web, print, and DVD resources. The project is expected to take about four years. The book will be neither comprehensive, nor definitive of the field. Whatever chapter structure is chosen the text will emphasise links between branches of the field and generic themes (such as the impact of computing). Insights from mathematics education will not be addressed specifically but will be implicit in many places. The Design Team seeks input from all those working in the mathematical sciences, researchers and educators alike. We welcome written communications, but will also be holding several "Klein conferences" around the world where feedback on draft ideas and material can be given, and original contributions offered. The actual writing will be done by invited authors of proven experience in expert and inspiring authorship. Anyone wishing to be on a mailing list to be kept up to date and receive draft material is invited to send an email in the first instance to <b.barton@auckland.ac.nz>. A website is in the process of being established. Comments are invited on the choice of Chapter titles (bearing in mind the comments above) :

- Introduction
- Topic Chapters   - Arithmetic   - Logic   - Algebra & Structures   - Geometry   - Functions & Analysis   - Discrete & Algorithmic mathematics   - Mathematics of Computation   - Probability & Statistics
- Theme Chapters   - Intradisciplinarity (i.e. internal connections)   - Mathematics as a living discipline inside science and society   - How mathematicians work Bill Barton, Vice-President of ICMI, b.barton@auckland.ac.nz

3. A XXIst century Felix Klein's follow up workshop

Didactics of Mathematics as a Mathematical Discipline (a XXIst century Felix Klein's follow up) An international workshop, Funchal (Madeira), Portugal, October 1-4, 2009 http://glocos.org/index.php/dm-md/

A century ago Felix Klein's lectures on mathematics for secondary teachers were first published : "Elementarmathematik vom höheren Standpunkte aus" (1908). This comprehensive view challenged both teachers and mathematicians to consider the relationship between mathematics as a school subject, and mathematics as a scientific discipline. As Klein wrote : "we first raise the question as to how these things are handled in the schools ; then we shall proceed to the question as to what they imply when viewed from an advanced standpoint." To this we must add "another point in this instruction which is usually neglected in university teaching. It is ` the application of numbers to practical life."

This last 100 years have witnessed many changes in mathematics that provoked major changes and challenges for school mathematics. The role of mathematics in the education of scientists, economists and engineers seems to have achieved unprecedented societal unanimity. While Klein's writing remains a valuable source insight, it seems timely to revisit this theme by linking the topics and approaches of upper secondary with the field of mathematics. This is an important challenge for Mathematics Education.

Can we analyse the new challenges for mathematics in the XXIst century ? Can we devise a XXIst century book that will be "read with pleasure and profit alike by the scholar, the student, and the teacher" (AMS Book Reviews 1940) taking into account all the dimensions Klein stressed : intuitive, genetic, applications ?

This workshop aims at discussing this subject, contemplating the following strands :

- a)   Which special characteristics can be found in mathematics as a school subject for the XXIst century ?
- b) Which kind of relationships between mathematics as a school subject and mathematics as a scientific discipline must be developed/implemented ?
- c) Which challenges are national and which are international ? Which are individual and which are societal ?
- d)   Which new mathematics should be included (apart from arithmetic, algebra, analysis and geometry), why and from which "advanced standpoint" ?
- e)   What should be the methodology of such a book in order to be read by "the scholar, the student, and the teacher" ?
- f)   How to integrate "elementary" recent applications in such a book ?
- g)   Which kind of multimedia tools would be most useful to accompany and amplify the impact such a book ?

The workshop will include 20-30 invited speakers will present their views in 30m lectures, followed by discussions ; there will be a slot for some other presentations selected by the organizing committee from the proposals received (20m presentations). The deadline for proposals is September 7. Please register at the website http://glocos.org/index.php/dm-md/

Already confirmed invited speakers include John Mason, Ulrich Kortenkamp, M. Artigue, U. Bottazzinni, Abraham Arcavi, Arselio Martins, João Pedro Ponte, Tomás Recio, Gert Schubring, T. Banchoff, R. Strasser, S. Xambó, M. Hohenwarter, Bernard R. Hodgson and Bill Barton.

The Organizing Committee is Elfrida Ralha (Univ. Minho), Jaime Carvalho e Silva (Univ. Coimbra), Suzana Nápoles (Univ. Lisboa), José Manuel Castanheira (Univ. Madeira), Elsa Fernandes (Univ. Madeira), Sandra Mendonça (Univ. Madeira).

The workshop is organized by CIM-Centro Internacional de Matemática and announcements can be found in http://www.cim.pt/ ?q=events and a short note about the workshop can be found in the CIM Bulletin : http://www.cim.pt/files/publications/b26.pdf

Jaime Carvalho e Silva, Member-at-large, ICMI-EC, Organizing Committee, jaimecs@mat.uc.pt

4. ICMI AWARDS - Call for Nominations

THE ICMI AWARDS COMMITTEE Announcement : Call for Nominations As is probably well known to most mathematics educators around the world, the Executive Committee of the International Commission on Mathematical Instruction (ICMI) a number of years ago created two awards, each in the form of a diploma and a medal, to recognise outstanding accomplishments in mathematics education research : . the Hans Freudenthal Award, for a major programme of research on mathematics education, . the Felix Klein Award, for lifelong achievement in mathematics education research.

An ICMI Awards Committee has been appointed for selecting the awardees. The President of ICMI has appointed Professor Mogens Niss to chair this committee, the other members of which are anonymous until their terms have come to an end.

The first recipients of these two awards, Professor Guy Brousseau (France) for the Felix Klein Award and Professor Celia Hoyles (UK) for the Hans Freudenthal Award, formally received these at the opening ceremonies of ICME-10 in Copenhagen, in July 2004. The two 2005 awards went to Professors Ubiratan D'Ambrosio (Brazil) (the Klein Award) and Paul Cobb (USA) (the Freudenthal Award), and for 2007, Professors Jeremy Kilpatrick (USA) and Anna Sfard (Israel/UK/USA) received the Klein and the Freudenthal Awards, respectively. The awards for 2005 and 2007 were formally presented to the recipients at the opening ceremony of ICME-11 in Monterrey, México, in July 2008.

The ICMI Awards Committee is now entering a fourth cycle of selecting awardees for 2009. The result of this process will be known by the end of 2009. The 2009 Awards will be presented to the recipients at ICME-12 in Seoul, Korea in 2012. As was the case with the previous cycles, the ICMI Awards Committee welcomes suggestions coming from the mathematics education community, hence this call for nominations.

A nomination of a candidate for the Felix Klein or the Hans Freudenthal Award has to be accompanied by a summary presenting the vita and the achievements of person nominated, as well as the reasons for the nomination. Moreover, nominations also have to include the names and coordinates of two or three persons from whom the committee may seek further information. All proposals must be sent by e-mail (mn@ruc.dk) to the Chair of the Committee no later than 15 September 2009. Mogens Niss, Chair of the ICMI Awards Committee, IMFUFA, NSM, Building 27, Roskilde University, P.O.Box 260, DK-4000 Roskilde, DENMARK

5. ICMI Digital Library

The International Commission on Mathematical Instruction (ICMI) is pleased to announce the inauguration of its Digital Library. The project of an ICMI Digital Library, where eventually "all" publications related to ICMI and its activities will be made freely available online, has been under discussion for a long time. Thanks to the support received from the International Mathematical Union, and especially the IMU Committee on Electronic Information and Communication (CEIC), much progress has been made recently as regards this project, and in particular the digitisation of past ICMI material.

ICMI is celebrating this opening with the posting online of the Proceedings of the symposium organised in 2000 on the occasion of the centennial of L'Enseignement Mathématique, the official organ of ICMI. The ICMI Executive Committee wishes to express its gratitude to the editors of L'EM for generously granting permission to post on the ICMI website the book : One Hundred Years of L'Enseignement Mathématique : Moments of Mathematics Education in the Twentieth Century. Proceedings of the EM-ICMI Symposium (Geneva, 20-22 October 2000) Edited by D. Coray, F. Furinghetti, H. Gispert, B.R. Hodgson, G. Schubring (ISBN 2-940264-06-6) softbound ; 336 pages, 2003 ; 63 CHF (L'Enseignement Mathématique, Monograph no. 39).

More material will be made accessible progressively, including all the issues of the ICMI Bulletin, the volumes resulting from the ICMI Studies or the Proceedings of the ICME congresses. It is also our intent to include in the Digital Library other documents related to activities organised under the auspices of ICMI, such as the proceedings of ICMI regional conferences.

Comments and suggestions about the ICMI Digital Library Project and how to make it a useful tool for the community are most welcome and should be sent to the Secretary-General of ICMI, Bernard R. Hodgson (bhodgson@mat.ulaval.ca).

The Digital Library can be directly accessed via the ICMI website

http://www.mathunion.org/ICMI/ Bernard R. Hodgson, Secretary-General of ICMI, bhodgson@mat.ulaval.ca

6. ICME-13 Bids Intention - November 1

The deadline for submitting bids for hosting ICME-13, to be held in 2016, is November 1, 2010. However countries considering making such a proposal should inform the Secretary-General of ICMI of their intention by November 1, 2009. The decision about the site of ICME-13 will be announced before the end of 2013.

Preparing a Bid to Host an ICME

The main aspect to keep in mind when preparing a bid proposing to host the International Congress on Mathematical Education is to provide conviction for the ICMI Executive Committee that the candidate country is in a favorable position of accomplishing this non-trivial task. The document submitted should thus address aspects such as the following.

- Inviting bodies

The bid should define the set of inviting bodies, i.e. those who submit the bid. In most cases this set consists of a coalition of bodies (like learned societies, associations, academies, universities, official national or provincial authorities). This aspect is to ensure that the invitation has sufficiently broad support in the proposed host country and that all major parties concerned with mathematics education stand behind the bid. Also of importance is the actual involvement of the local mathematics education community so as to create a nice ambiance around and during the meeting.

- Scientific infrastructure

The document should present the scientific infrastructure in the bidding country that will be supporting the congress.

This is to demonstrate the presence of a sufficiently large group of mathematics educators in the country to provide national backup of the scientific program. In particular, the document should clarify whether there is a substantial core of educators in the country with experience in international meetings.

▶   Venues

The bid should indicate possible venues within the country (city and institutions in which the congress would take place), describing their advantages and disadvantages in relative terms. This includes a presentation of the technical congress facilities (in particular the availability of rooms of various types and sizes, among others for the plenary sessions, or usual standards such as air conditioning or presentation equipment), transportation to the site as well as on-site, and the variety of local accommodation facilities, ranging from inexpensive student residence type accommodation to high-class international hotels. Eventually, the bid should address other local concerns, such as the security of participants.

▶   Logistic infrastructure

The document submitted should outline the logistic infrastructure of the congress in order to demonstrate that a sufficiently advanced, varied and capable organization system is - or can be put - in place to deal with all matters pertinent to the local organization of a multi-faceted and complex congress of about 3500 participants.

▶   Financial infrastructure

The bid should describe the financial infrastructure of the congress, indicating the size of the funds that are expected to be available to the congress, and listing the organizations, institutions, and bodies in the bidding country that are ready - or may be expected - to support the congress financially in terms of money, services, equipment or manpower. The bid should also address the specific issue of possible help to participants from non-affluent countries, as well as the expected level of registration fees for congress participants.

The above is not meant to be an exhaustive check-list of matters to be considered one after the other in preparing a bid, but it gives the flavor of the natural questions the decision makers, namely the Executive Committee of ICMI, will be considering, in addition to other issues such as the broad geographical distribution of the ICME congresses. The best general guidance in preparing a bid may be found in the following summary : the document has to have two properties, namely, (a)   an existence proof (or at least a good sketch of one) that the inviting consortium can actually manage all aspects of the Congress ; (b)   features that make the Executive Committee of ICMI think that the present bid is not only feasible, but also better than other potential bids. Of course, as the quality of a bid is a multi-faceted concept, there is freedom to balance weaker points in a potential bid with stronger ones. Requests for further information about the preparation of a bid to host an ICME should be addressed to the Secretary-General of ICMI.

Bernard R. Hodgson, Secretary-General of ICMI, bhodgson@mat.ulaval.ca

7. The 14th Asian Technology Conference in Mathematics

(ATCM 2009), December 17-21, 2009, Beijing Normal University, Beijing, China

The ATCM 2009 is an international conference to be held in China that will continue addressing technology-based issues in all Mathematical Sciences. Thanks to advanced technological tools such as computer algebra systems

(CAS), interactive and dynamic geometry, and hand-held devices, the effectiveness of our teaching and learning, and the horizon of our research in mathematics and its applications continue to grow rapidly. The aim of this conference is to provide a forum for educators, researchers, teachers and experts in exchanging information regarding enhancing technology to enrich mathematics learning, teaching and research at all levels. English is the official language of the conference. There will be over 400 participants coming from over 33 countries around the world. Be sure to submit your abstracts or full papers in time.

Plenary Speakers
- Bogumila KLEMP-DYCZEK (Poland) Nicolaus Copernicus University, Poland. Sung Je Cho (South Korea) Chair of the International Program Committee, ICME 12.
- Wei-Chi YANG (USA) Founder-ATCM and eJMT.
- Jing-zhong ZHANG (China) Academician of the Chinese Academy of Science.
- Yingbo ZHANG (China) Member of the Executive Committee of the ICMI, Director of Education Committee of the Chinese Mathematical Society.

Invited Speakers
- Keng Cheng ANG (Singapore)
- Douglas BUTLER (UK)
- Jen-chung CHUAN (Taiwan)
- Miroslaw MAJEWSKI (UAE)
- Changpei WANG (China)

We invite you to submit original and unpublished work to the conference for review. Each submission will be reviewed and the author(s) will be notified of recommendation by the International Program Committee. Only scholarly work that has not been published elsewhere should be submitted for consideration. Accepted abstracts and refereed Full Papers will be published at the Proceedings of ISSN 1940-2279 (CD) and ISSN 1940-4204 (Online). We also will publish a hard copy Proceeding for ATCM 2009.

Selected referred papers will be invited for consideration of publication at the Electronic Journal of Mathematics and Technology.

Important Notes :
- * For all Authors and Reviewers, we are using a new reviewing system, you need to log in the online reviewing system and fill out a simple form by clicking on 'register' next to 'Login' when you login first time. Especially, be sure to select the fields best describe your paper and your interests, this will provide the best match between Authors and Reviewers.
- * If you want to send in more than one submission, you can log in the reviewing system (after entering your user name and password) again and select 'Upload Submission'.
- * If you plan to present your talk or poster session with an abstract, you may submit your abstract without a full paper by July 30, 2009 (extended).
- * If you plan to present your talk and consider publishing your full paper at the ATCM 2009 Proceedings, you may submit your FULL Paper by July 30 of 2009 for reviewing.   * We will distribute a hard copy of accepted abstracts at the conference. The accepted Full Papers will appear in Electronic format : A CD will be distributed at the conference and an Electronic Proceedings will be available after the conference.

Wei-Chi Yang, Co-chair of IPC, wyang@radford.edu

8. Online version of the Journal of Mathematics Education (JME)

I am pleased announce that the Journal of Mathematics Education (JME) online version is ready for free public review. The website is http://educationforatoz.com/journalandmagazines.html. We would like to invite all mathematics educators to review these online articles and provide feedback, if any.

The Journal of Mathematics Education (JME) is a semi-annual and peer-reviewed professional academic research journal. JME aims at promoting communication in mathematics education between the United States and China as well as between the West and East in general. The goal of JME is to provide opportunities for all scholars to conduct research on mathematics education, with emphasis on assessment, curriculum, instruction, theory, technology, equity, and other issues relating to mathematics education. The Journal of Mathematics Education is published semi-annually in hard copy (ISSN 1945-7502) and online (ISSN 1945-7 448) by Education for All.

We welcome all mathematics education researchers to contribute to JME, and we also welcome all mathematics educators to be a reviewer and join our peer review process. Thanks for your support.

Zhonghe (John) Wu, Mathematics Education @ National University - Costa Mesa, CA, zwu@nu.edu

9. RELIME (Latin American Journal of Mathematics Education)

The "Revista Latinoamericana de Investigación en Matemática Educativa", RELIME (Latin American Journal of Mathematics Education), published by the "Comité Latinoamericano de Matemática Educativa", CLAME (Latin American Committee of Mathematics Education), recently has been incorporated to the "Social Sciences Citation Index of the ISI Web of Knowledge". With this, two of the research journals in our field have been included in ISI Web, the other one being JRME, the Journal for Research on Mathematics Education.

RELIME invites you to submit your research papers in any of the following languages : Spanish, English, French or Portuguese. For form of manuscripts and other guides for authors, please check RELIME webpage, http://www.clame.org.mx/relime.htm

Ricardo Cantoral, Director, RELIME, rcantor@cinvestav.mx

10. Calendar of Events of Interest to the ICMI Community

PME33 - 33rd Annual Meeting of the International Group for the Psychology of Mathematics Education Thessaloniki, Greece, July 19-24, 2009 http://www.pme33.eu

Bridges Banff - Mathematics, Music, Art, Architecture, Culture The Banff Centre, Banff, Alberta, Canada, July 26-29, 2009 http://bridgesmathart.org/bridges-2009/

CIEAEM61 - Commission internationale pour l'étude et l'amélioration de l'enseignement des mathématiques Université de MONTRÉAL, Montréal, Québec, Canada, July 26-31, 2009 http://www.cieaem.net/

ICTMA 14 - 14th International Conference on the Teaching of Mathematical Modelling and Applications University of Hamburg, Germany, July 27-31, 2009 http://www.ictma14.de/

SEMT '09 - 10th bi-annual conference on Elementary Mathematics Teaching, "The development of mathematical understanding" Prague, August 23-28, 2009 http://kmdm.pedf.cuni.cz

4th general meeting of European Women in Mathematics (EWM) University of Novi Sad, Serbia, August 25-28, 2009 http://ewm2009.wordpress.com/

"Models in Developing Mathematics Education" The Mathematics Education into the 21st Century Project Dresden, Saxony, Germany, September 11-17, 2009 alan@rogerson.pol.pl

ICREM4 - The 4th International Conference on Research and Education in Mathematics 2009

Kuala Lumpur, Malaysia, October 21-23, 2009 http://einspem.upm.edu.my/icrem4/

CoSMEd -Third International Conference on Science and Mathematics Education Improving Science and Mathematics Literacy : Theory, Innovation and Practice Penang, Malaysia, November 10-12, 2009 http://www.recsam.edu.my/cosmed/

2009 SAMSA Conference Southern Africa Mathematical Sciences Association Belinda Hotel, Dar es Salaam, Tanzania, November 23-27, 2009 http://www.samsajournal.org/

SRD'09 - Southern Right Delta'09 7th Southern Hemisphere Conference on the Teaching and Learning of Undergraduate Mathematics and Statistics Gordons Bay, South Africa, 29 November-4 December 2009 http://www.delta2009.co.za

"Numeracy : Historical, philosophical and educational perspectives" St Anne's College, Oxford, England, December 16-18, 2009 benjamin.wardhaugh@all-souls.ox.ac.uk

ATCM 2009 - The 14th Asian Technology Conference in Mathematics Beijing Normal University, Beijing, China, December 17-21, 2009 http://atcm.mathandtech.org or http://atcm.mathandtech.com

10th Islamic Countries Conference on Statistical Sciences (ICCSS-10) Cairo, Egypt, December 20-23, 2009 http://www.iccs-x.org.eg/

11. ICMI encounters : George Polya (1887-1985) and Lev Pontryagin (1908-1988)

Brief Encounters It was suggested that instead of the usual historical vignette I should write a note about some of the great mathematicians that I have met during my work for ICMI. There have been very many, of which there is space here to describe only two, but I hope that this selection together with an indication of their work in mathematics education will prove of interest.

The first, George Polya (1887-1985), was an invited guest at ICME2 in 1972. He did not lecture there but submitted a paper consisting of ten quotations that 'helped ` clarify [his] opinions' on the teaching of mathematics. As the editor of the proceedings I was initially disappointed not to receive a longer contribution from him, but soon realised that value and length are independent variables and Polya's selection can still inspire thought and admiration. This was not the first time I had met Polya for he had been an invited lecturer at the First Commonwealth Conference on Mathematical Education held in Trinidad in 1968. There I had been asked to chair a working group and it was with considerable trepidation that I learned that Polya was to be a member of it. Would he dominate it ? Would his presence inhibit others from putting forward their views ? My fears were ungrounded. Polya, whom I soon discovered to be a most likeable person, made his contributions to the discussion but in a gentle and seemingly

tentative way, and throughout listened to what others had to say while giving the impression that this was the first time he had heard such interesting ideas. Polya was, of course, not only a great mathematician, but also he made important contributions to mathematics education.

Polya did not originally study mathematics at university and it was only when he switched to philosophy that his professor suggested that he should also learn some mathematics in order better to understand philosophy. It was mathematics though that was to retain Polya. After study at Budapest, Vienna and Göttingen (with mathematicians such as Klein and Hilbert), Polya was to accept a post in Zurich. There during the war years he was separated from his native Hungary. If he returned he would be conscripted for service in a war that he, a pacifist, could not support. Later, if he returned he could be charged with having evaded conscription. It was 54 years before he returned to his native land. Yet in the meantime he, together with his compatriot Szegö, wrote what was a totally novel text, Problems and Theorems in Analysis (Springer, 1925 - in German), which classified problems not by subject but by their methods of solution. It was the first indication of that interest in heuristics which was later to produce the books How to solve it, Mathematics and Plausible Reasoning and Mathematical Discovery. Perhaps the title of the first of these - widely translated, still in print and having sold well over a million copies - might transgress the present-day Trades Descriptions Act, for it does not guarantee that the reader will always find a solution, but it remains a key work : as Schoenfeld wrote, work on problem solving is now divided into two eras : 'before and after Polya'.

The second mathematician I have chosen to write about is that remarkable Russian, Lev Pontryagin (1908-1988). In the 1950s I owned his book, Topological Groups, and I had heard of this remarkable person who, although blinded in an accident at the age of 14, had become one of the word's greatest mathematicians. One of the joys of attending international congresses is that one can see, even if one cannot talk to, the people who have so greatly influenced one's subject. I was thrilled then at the Stockholm 1962 congress of mathematicians to see this legendary person. I did not imagine at that time that I would ever have the chance of speaking with him. This came about when just after being appointed secretary of ICMI, but before taking up office, I went to Moscow in 1982 with a team of 12 British mathematics educators in order to discuss common problems and possible methods of solution with a similar team drawn from the USSR. My USSR colleagues then suggested that I might attend a meeting of what I believe was called the USSR Committee on Secondary School Mathematics in order to tell them about the planned 1984 Adelaide ICME in the hope that this would encourage the USSR to send a delegation to it. This provided me with the opportunity to talk with and listen to Pontryagin. He it was who chaired that meeting in the absence through illness of Pavel Alexandrov (1896-1982) (Pontryagin's teacher who had inspired his work in topology) and Andrei Kolmogorov (1903-1987). Shortly before I went to Moscow, Hassler Whitney (at that time president of ICMI) had visited our home and when told about my planned trip he reminisced about how he had visited Moscow in the mid-1930s to attend a conference on topology and had met Pontryagin then. I was able to convey Hass's good wishes to Pontryagin, which prompted his memories of that occasion. But it was a chance remark made by Pontryagin at the committee meeting that seized my attention. The committee was discussing the place of complex numbers in the higher grades of school and Pontryagin gently remarked that the subject was in the curriculum in Tsarist times. It suddenly struck me what turbulent times this man had lived through : he would have been 9 at the time of the Russian revolution, and would have attended school at the time that Nadja Krupskaya (1869-1939) (Lenin's wife) and Anatoly Lunacharsky (1875-1933) were attempting to reform education along socialist lines (which included abolishing examinations). He would have witnessed Stalin's overthrow of these schemes, the Stalinist purges of the 1930s, the arrival of Hitler's forces at the outskirts of Moscow, and the 'cold war' that followed the cessation of hostilities. What a story he would have to tell. But what of his personal struggles ? Blinded at 14 and from a poor family he relied on his mother effectively to be his secretary and to read mathematics texts and papers to him although she herself knew no mathematics and had to fall back on describing rather than naming symbols. Aged 17 he entered the University of Moscow where, without being able to take notes and without present-day recorders to help, he had to memorise lectures as they were given. Yet aged 19 he already began to produce important mathematical results within topology.

The committee that I attended had, then, three of the greatest mathematicians of the twentieth century - Russian or otherwise - on its secondary schools mathematics committee. The word gerontocracy might spring to mind, but

these were men who were passionately interested in the mathematics taught in schools. Kolmogorov had led far reaching innovations in the 1960s (which Madam Maslova described at ICME 1) and was responsible for the establishment of schools for highly gifted mathematics students which not only allowed their mathematical talents to be developed but also ensured they had a rounded education with music and literature given special emphasis. Kolmogorov was invited to speak at ICME 2 but at the last moment was replaced by Sergei Sobolev (1908-1989) another outstanding mathematician with a close involvement in mathematics education whom I had the pleasure of meeting both at Exeter and later in Tokyo.   By the 1980s Pontryagin and Kolmogorov were in open disagreement about the nature of the school mathematics curriculum and it was the former's more conservative views that now prevailed. Indeed Brezhnev, no less, proclaimed that, in line with Pontryagin's views, a vector should again be taught as something having magnitude and direction. Yet what is important for ICMI is the interest that these great mathematicians had in education. And it was not just a case of saying what should be done. Kolmogorov wrote textbooks for schools as did, for example, the leading Academicians, Alexei Pogorelov (1919-2002, and one of the members of the USSR team that we met with in Moscow) and Sergei Nikolskii (1905-) the remarkable centenarian who served on the IPC for ICME 6 and, aged 99, gave a talk at the Russian exhibition at ICME 10.

It is good that ICMI has achieved a degree of independence from the International Union of Mathematicians, but I believe that if ICMI proceeds further in narrowly focusing on research in mathematics education at the expense of accumulated professional wisdom, then it will be to the detriment of what we, hopefully, are seeking to do : to improve mathematics education at all levels. We cannot sensibly ignore the contributions that mathematicians such as those to whom I have here referred made and which mathematicians, even if of lesser standing, can still make. Geoffrey Howson, former Secretary-General of ICMI

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