

International Studies in the History of Mathematics  
and its Teaching

*Series Editors:* Alexander Karp · Gert Schubring

Fulvia Furinghetti

Livia Giacardi *Editors*

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The International  
Commission  
on Mathematical  
Instruction, 1908-2008:  
People, Events,  
and Challenges in  
Mathematics Education



Springer

# **International Studies in the History of Mathematics and its Teaching**

## **Series Editors**

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The International Studies in the History of Mathematics and its Teaching Series creates a platform for international collaboration in the exploration of the social history of mathematics education and its connections with the development of mathematics. The series offers broad perspectives on mathematics research and education, including contributions relating to the history of mathematics and mathematics education at all levels of study, school education, college education, mathematics teacher education, the development of research mathematics, the role of mathematicians in mathematics education, mathematics teachers' associations and periodicals.

The series seeks to inform mathematics educators, mathematicians, and historians about the political, social, and cultural constraints and achievements that influenced the development of mathematics and mathematics education. In so doing, it aims to overcome disconnected national cultural and social histories and establish common cross-cultural themes within the development of mathematics and mathematics instruction. However, at the core of these various perspectives, the question of how to best improve mathematics teaching and learning always remains the focal issue informing the series.

Fulvia Furinghetti • Livia Giacardi  
Editors

The International  
Commission on  
Mathematical Instruction,  
1908-2008: People, Events,  
and Challenges in  
Mathematics Education

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*To our beloved mothers Teresa and Annetta*

# Preface

*After all, [I believed that] the entire field of mathematical learning, from the modest beginnings in elementary school to the highest level of specialised scientific research, had to be recognised and organized as an organic whole. It became clearer and clearer to me that, if these further perspectives were to be neglected, even pure scientific research itself would have to suffer. [and] that, by closing off the varied, ongoing lively cultural developments, it would condemn itself to wilting, like a plant deprived of sunlight in a cellar. (Klein 1923)<sup>1</sup>*

*We sometimes wonder if the time we devote to questions concerning teaching would have been better used in scientific research. Well, our answer is that it is a social duty that forces us to deal with these problems ... Should we not facilitate human beings in acquiring knowledge, which is a source of both power and happiness? (Castelnuovo 1914)<sup>2</sup>*

*In no other living science is the part of mise en forme, transposition didactique, so important at a research level. In no other science, however, is the distance between the taught and the new so large. In no other science has teaching and learning such social importance. In no other science is there such an old tradition of scientists committed to educational questions. (Kahane 1990)<sup>3</sup>*

These quotes by two presidents (Klein and Kahane) and a vice-president (Castelnuovo) of the Commission, which, born as the *Commission Internationale*

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<sup>1</sup>Klein, Felix. 1923. Göttinger Professoren. Lebensbilder von eigener Hand. 4. Felix Klein. *Mitteilungen des Universitätsbundes Göttingen* 5, p. 24. The original text is: “Schließlich war das gesamte Gebiet mathematischen Lernens von den bescheidenen Anfängen in der Volksschule bis zur höchsten wissenschaftlichen Spezialforschung als ein organisches Ganzes zu erfassen und auszugestalten. Es wurde mir immer deutlicher, dass durch Vernachlässigung dieser weiteren Ausblicke auch die rein wissenschaftliche Forschung selbst leiden müsse, dass sie sich durch Abschluss von der vielseitigen, lebendig pulsierenden allgemein geistigen Entwicklung wie ein der Sonne entzogenen Kellerpflanze zur Verkümmerng verurteile.”

<sup>2</sup>Castelnuovo, Guido. 1914. Discours de M. G. Castelnuovo. *L'Enseignement Mathématique* 16, p. 191. The original text is: “nous nous demandons parfois si le temps que nous consacrons aux questions d’enseignement n’aurait pas été mieux employé dans la recherche scientifique. Eh bien, nous répondons que c’est un devoir social qui nous force à traiter ces problèmes [...] Ne devons-nous pas faciliter à nos semblables l’acquisition du savoir, qui est à la fois une puissance et un bonheur?”.

<sup>3</sup>Kahane, Jean-Pierre. 1990. A farewell message from the retiring president of ICMI. *ICMI Bulletin* 29, p. 6.

*de l'Enseignement Mathématique/ Internationale Mathematische Unterrichtskommission* (CIEM/IMUK), became the present International Commission on Mathematical Instruction (ICMI), epitomize two aspects that we consider to be central in the life of ICMI: the importance of dealing with problems concerning the teaching of mathematics for scientific research too, and the social role of mathematics education.

Mathematics is a universal discipline and therefore it is international par excellence. Mathematics and mathematics education, though naturally linked, are different as for areas of knowledge, methods, domains of practice, and academic role.

ICMI is an excellent lens to grasp the evolution of mathematics education, changing relationships within the community of mathematicians, and the process of achieving international cooperation in the field of mathematical teaching and learning.

At present, the ICMI's objectives, as Hyman Bass and Bernard Hodgson write, could be globally described as offering researchers, practitioners, curriculum designers, decision makers, and others interested in mathematical education a forum for promoting reflection, collaboration, exchange and dissemination of ideas, and information on all aspects of the theory and practice of contemporary mathematical education, as seen from an international perspective<sup>4</sup>

These objectives developed and matured during the twentieth century – beginning with the initial aim of the Commission to carry out a comparative study of the syllabi and teaching methods of secondary schools in the various countries<sup>5</sup> – thanks to the work of mathematicians, educators, and teachers and the stimuli of the international events of the time.

The purpose of this volume is to understand and outline the evolution of the objectives and field of action of ICMI, from its creation in 1908 in Rome until 2008, through the description of the main events and protagonists of ICMI history.

In the century of the Commission's existence, it is possible to identify various phases that were the result of both external events, such as WWI and WWII, which influenced its activities, as well as changes in centers of interest and broadening of the field of action of the Commission itself. The period from the foundation up to the WWI was characterized by the creation of an important international network of national subcommissions to prepare reports both on the state of mathematics teaching in the various countries, and on specific topics. It was so strongly influenced by the first president Klein that it was called *Klein's Era*.

The effects of WWI undermined scientific internationalism and the shocking decision was made to ban researchers in the former Central Powers from most international activities. This led to the decision to dissolve the CIEM/IMUK in 1920–1921. International scientific cooperation, and therefore also the Commission,

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<sup>4</sup>Bass, Hyman and Hodgson, Bernard. 2004. The International Commission on Mathematical Instruction What? Why? For Whom?. *ICMI Bulletin* 55, pp. 26-27.

<sup>5</sup>Castelnuovo, Guido (ed.). 1909. *Atti del IV Congresso Internazionale dei Matematici*. Roma: Tipografia della R. Accademia dei Lincei, Vol. I, p. 51.

was only restored in 1928 on the occasion of the ICM in Bologna. The reborn Commission was not able to produce new ideas and limited itself to concluding the projects started in the past. Its activities had a second forced arrest due to the outbreak of WWII.

After the end of the war, in 1952, the Commission (now ICMI) was reconstituted as a permanent subcommission of the newly restored International Mathematical Union (IMU). In the following years, with some difficulties, ICMI defined its structure and relations with IMU and established both scientific and organizational collaborations with other associations thus leading to greater internationalization and to new approaches to mathematics education.

At the end of the 1960s, the action of ICMI received a remarkable impetus from the initiatives carried out by its president Hans Freudenthal, who, with his organizational talent and above all his strong spirit of independence, founded a new international journal dedicated to mathematics education and organized the first International Congress on Mathematical Education (ICME). These important initiatives mark a turning point in the history of ICMI, projecting it towards the future.

Recent decades have seen an important change in the relations between mathematicians and educators which led in 2006 to the evolution in the governance of ICMI for which the election of the ICMI Executive Committee was to be carried out directly by the General Assembly of ICMI itself and not by that of IMU as in the past.

The present volume consists of three parts, each exploring different facets of these 100 years of ICMI life.

In Part I, four chapters retrace the various stages of the Commission's life over its 100 years of history, through an analysis of published and unpublished sources. The periods we have singled out are the following:

- Foundation and early period up to WWI;
- Rebirth in 1952 as a permanent IMU subcommission down to Freudenthal's innovations;
- "Renaissance" in the late 1960s and further development up to 2008.

In Chap. 1, Gert Schubring describes the origins of the movement toward international cooperation and the establishment of an active network of mathematics educators, also presenting the key figures in this story. The work of CIEM/IMUK is described, showing the problems in the constitution of the Commission, then its "golden period" in the years before WWI, and the friction due to this war, leading to its dissolution in 1920. The last part of the chapter deals with the ephemeral reconstitution in 1928 until its "sleeping mode" from 1936 on. The whole chapter is based on a considerable amount of archival material.

Chapter 2 by Fulvia Furinghetti and Livia Giacardi analyzes the evolution of ICMI after its establishment in 1952 as a subcommission of the International Mathematical Union (IMU). The changes in society and research, and movements such as New Math, made the need evident for new paradigms for approaching the problems of mathematical instruction. The collaboration with international bodies such as UNESCO and OEEC/OECD fostered new initiatives on every continent.

The three main lines of investigation chosen to study the history of ICMI in the 20 years after WWII are the following: the relationships between IMU and ICMI, which often resulted in relationships between pure mathematicians and educators; the emergence of mathematics education as an autonomous field of research; and the change in ICMI's objectives. These aspects occur in a transversal way in the work of the various Executive Committees that came one after another in this period. However, it was only under the presidency of Freudenthal, who launched two important initiatives – a journal and a tradition of conferences specifically dedicated to mathematics education – that the concomitance of these three aspects ushered in a new season for ICMI. This chapter is largely based on the unpublished documents presented in Chap. 4.

In Chap. 3, Marta Menghini outlines the life of ICMI after Freudenthal's important and innovative initiatives. One of these was the creation of the *International Congresses on Mathematics Education* (ICMEs). Since 1969, these congresses have marked the life of ICMI: they have given voice to ICMI's Executive Committee, its president, and its secretary, and also featured the principal topics and actors within mathematics education from an international perspective. Each congress has become an important date in the life of researchers, teachers, and people involved in various ways in mathematics education. In this chapter, the evolution of ICMI is analyzed through a study based on the proceedings of successive ICMEs. Oral interviews released by prominent actors on the ICMI scene provide further information on this period of consolidation of the Commission and creation of new trends in mathematics education research.

In Chap. 4, Livia Giacardi presents a wide selection of unpublished letters and documents belonging to the period 1952–1974, coming from different archives, especially from the IMU Archive. The purpose is to highlight—through the voice of the protagonists—unknown or lesser-known aspects of the ICMI history, such as, for example, the not always harmonious relations between ICMI and IMU as well as the internal dynamics of the Commission, and to discover the true motivations behind certain actions.

Part II presents useful data about the life of ICMI: “The Timeline of ICMI 1908–2008” (F. Furinghetti and L. Giacardi); “The Central and Executive Committees of CIEM/IMUK and ICMI” (F. Furinghetti); “Terms of Reference for ICMI (1954–2007)” (L. Giacardi); “Mathematics Education in the International Congresses of Mathematicians 1897–2006” (F. Furinghetti); “Maps on the Process of Internationalization of ICMI” (L. Giacardi); and “The Beginning of an Adventure: Glances at the First ICME” (Lyon 1969) (F. Furinghetti).

Part III contains the biographical portraits of the 54 members of the Central/Executive Committee of ICMI who passed away in the first 100 years of ICMI. Almost all of them were professional mathematicians; David E. Smith, who was an educator, is the most remarkable exception. Generally, these were scholars who were interested in problems concerning mathematics education and participated in various ways in the activities of ICMI. However, beginning in the 1950s, some mathematicians joined the ICMI Executive Committee as ex officio members

for the sole reason that they occupied certain institutional positions – such as the IMU presidency – but whose involvement in ICMI activities was modest.

Although for the famous figures various biographies are available, the portraits in Part III of the volume offer an opportunity to outline the actual involvement of these mathematicians in ICMI's development and, more generally, in mathematics education. Each of these portraits consists in a section of general information and a section dedicated to contributions, if any, to education. In the same vein, the bibliographic references are divided into a section containing a succinct selection of works on the person in question and his mathematical works, and a section including selected publications linked in some way to mathematics education (if any). Part III also contains portraits of the scholars awarded the title of Honorary Member of the Commission during the International Congress of Mathematicians in Oslo (1936) and Charles-Ange Laisant, one of the founders of *L'Enseignement Mathématique*, the official organ of ICMI.

The authors of the 63 portraits presented in Part III are 30 and belong to 18 countries.

Genoa, Italy  
Turin, Italy

Fulvia Furinghetti  
Livia Giacardi

# Acknowledgments

At the end of this work—which has involved the collaboration of 31 authors, mathematicians, historians, and researchers in mathematics education with the purpose of giving the readers a comprehensive picture of the first century of ICMI—we wish to thank all those who have provided their collaboration. First of all, heartfelt thanks go to the authors and referees who made it possible to carry out this work, and to Alexander Karp and Gert Schubring, the editors of the Springer Series International Studies in the History of Mathematics and its Teaching, for their constant support. Our most wholehearted thanks also go to: Jill Adler, Ferdinando Arzarello, Jerry Becker, Guillermo Curbera, Renaud d’Enfert, Corinna Desole, Judith Goodstein, Bernard Hodgson, Geoffrey Howson, Scott Jung, Erika Luciano, Elena Anne Marchisotto, Vilma Mesa, Manuel Ojanguren, Peter Ransom, Antonio Salmeri, Marta Sanz-Solé, Elena Scalambro, Norbert Schappacher, Kim Williams, and Erich Wittman, who in various ways have provided their help. Special thanks go to the directors and personnel of the various archives we explored: Birgit Seeliger (IMU Archives, Berlin); Tara Craig (Rare Book & Manuscript Library, Columbia University, New York); Sacha Auderset (UNIL, Université de Lausanne); Laura Garbolino, Antonella Taragna, Giulia Scarcia, and Giuseppe Semeraro (Biblioteca Matematica G. Peano, Università di Torino); Maria Barbieri (Biblioteca della Scuola di Scienze Matematiche, Fisiche e Naturali, Università di Genova); and Team dienstverlening Esther Graftdijk Noord-Hollands Archief.

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From 1996 to 2003, he coordinated several committees that wrote the math syllabus used for 15 years in Portuguese Secondary Schools (10th to 12th grades), including new courses like “Applied Mathematics for the Social Sciences” and “Mathematics for Art Students,” and math modules for vocational schools. He coordinated a group that in 2020 produced a report with recommendations for the improvement of mathematics education in Portugal, commissioned by the Portuguese Government.

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His main scientific result concerns complete classification of hyperspaces of 0-dim. compact, metric, spaces (see Chap. 4 of S. Todorčević, *Topics in Topology*, Springer 1997).

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He is currently studying matters related to the communication of mathematics and mathematical physics in countries away from the main centers of research.

**Osmo Pekonen** PhD, DSocSci, was born in Mikkeli, Finland (1960–2022). He studied mathematics in Paris, and was based at the University of Jyväskylä, Finland. He has published on differential geometry, string theory, k-theory, and history of mathematics. He was the book reviews section editor of *The Mathematical Intelligencer*.

**Adrian Rice** is the Dorothy and Muscoe Garnett Professor of Mathematics at Randolph-Macon College in Ashland, Virginia, USA, where his research focuses on nineteenth- and early twentieth-century British mathematics. In addition to papers on various aspects of the history of mathematics, his books include *Mathematics Unbound: The Evolution of an International Mathematical Research Community, 1800–1945* (with Karen Hunger Parshall); *Mathematics in Victorian Britain* (with Raymond Flood and Robin Wilson); and most recently *Ada Lovelace: The Making of a Computer Scientist* (with Christopher Hollings and Ursula Martin). He is a four-time recipient of awards for outstanding expository writing from the Mathematical Association of America.

**Aline Robert** has been a researcher in mathematics didactics since 1978, after several years of research in mathematics. She is a retired professor of Cergy Pontoire University and works in the LDAR, a didactical lab of the University of Paris named André Revuz.

She first worked on students' acquisitions in the first year of university. This led to the development of specific tools to study the proposed tasks in view of the targeted contents, assessed by a mathematical, curricular, and cognitive study. Her research then focused on the practices of secondary school teachers, according to the students' activities they can provoke. All of this work fed into the development of a training program for secondary school teacher educators, based on a specific use of the previous tools and on hypotheses about the development of practices inspired by the results of her research.

**Gert Schubring** is a retired member of the *Institut für Didaktik der Mathematik*, a research institute at Bielefeld University, and at present a visiting professor of the history of mathematics at the *Universidade Federal do Rio de Janeiro* (Brazil). His research interests focus on the history of mathematics and the sciences in the eighteenth and nineteenth centuries and their systemic interrelation with social-cultural systems. One of his specializations is history of mathematics education. He has published several books, among which is *Conflicts between Generalization, Rigor and Intuition: Number Concepts Underlying the Development of Analysis in 17th–19th century France and Germany* (New York, 2005). He was chief editor of the *International Journal for the History of Mathematics Education* from 2005 to 2015 and is co-editor of the series *International Studies in the History of Mathematics and its Teaching*, published by Springer.

**Reinhard Siegmund-Schultze** is a German historian of mathematics working in Kristiansand (Norway). He has published, among other things, on the history of functional analysis, probability theory, and applied mathematics; on Rockefeller and mathematics, and emigration of mathematicians from NS-Germany; and on the work of Richard von Mises.

**Man Keung Siu** obtained a BSc in mathematics and physics from the University of Hong Kong and went on to earn a PhD in mathematics from Columbia University. Like the Oxford cleric in Chaucer's *The Canterbury Tales*, "gladly would he learn, and gladly teach" for three decades at the University of Hong Kong before retirement in 2005, and is still doing the same. He has published research papers in mathematics and computer science, some more papers of a general nature in history of mathematics and mathematics education, and several books in popularizing mathematics. In particular, he is interested in integrating history of mathematics with the learning and teaching of mathematics, actively participating in an international community of history and pedagogy of mathematics since the mid-1980s.

**Harm Jan Smid** (1945) studied mathematics at the Leyden University. He was a math teacher from 1966 until 1975 and a lecturer at a teacher training college from 1975 until 1981. From 1981 until his retirement in 2007, he was assistant professor, later associate professor, of mathematics and mathematics education at the Delft University of Technology. He earned his PhD in 1997 with a thesis on the history of Dutch math teaching in the nineteenth century. He has published several articles and contributed to conference proceedings on the history of mathematics education.

**Henrik Kragh Sørensen** is professor of the history and philosophy of the mathematical and computational sciences at the University of Copenhagen. His research has focused on early-nineteenth-century analysis and algebra, on mathematics and science in Denmark, and on philosophy of mathematical practice. Currently he is working on developing and deploying tools from big data, digital humanities, and machine learning to ask and approach questions in the history and philosophy of mathematics.

**László Surányi** was born in 1949 in Budapest. He won third prize and first prize at the International Mathematical Olympiad (IMO) in the years 1966 and 1967, respectively. He studied mathematics at the Eötvös Loránd University (ELTE) Budapest during 1967–1972, where he also earned his doctorate in mathematics in 1977. During 1972–1982, he worked as a researcher at the Mathematical Institute of the Hungarian Academy of Sciences, Department of Graph Theory, Set Theory and Logic. Between 1982 and 2013, he taught mathematics to secondary school classes with a specialization in advanced mathematics.

His main research areas are “Sprachdenken” (the “dialogical thinkers” Ferdinand Ebner, Martin Buber, Franz Rosenzweig, and the Hungarian Lajos Szabó and Béla Tábor, see <http://lajosszabo.com/BPDISKANG.html>) and Metaaxiomatics (L. Surányi, *Metaaxiomatische Probleme*, 1992/99, see <http://lajosszabo.com/SL/maxnem.html>). He is also an author of several published essays and a book on music (in Hungarian see <http://lajosszabo.com/SL/publist.htm#zene>) and literary criticism.

**Stevó Todorčević** is a *Canada Research Chair* at the University of Toronto and is a *Directeur de Recherche* at CNRS, Paris. He is a member of the Serbian Academy of Sciences and Arts and is a Fellow of the Royal Society of Canada. He has published so far more than 170 research papers in mathematics including 5 research monographs.

**Sándorné Kántor Tünde Varga** was born in Debrecen (Hungary) in 1935. She graduated from the University of Debrecen in 1957 as a mathematics and physics teacher and received her PhD in 1977. She was a high school teacher (1957–1971) and university lecturer (1971–2018). Between 1971 and 1976, she was an assistant professor in the Department of Geometry at the Institute of Mathematics at the University of Debrecen (Hungary). She retired in 1995, but continued to hold classes till 2018.

Her areas of research: differential geometry, teaching mathematics and descriptive geometry, teacher training, in-service teacher training, mathematics competitions, talent management, history of mathematics and its education, and history of the University of Debrecen.

In addition to professional articles (more than 200, in Hungarian, German, English), she wrote several books.

**Gregg De Young** has taught in the Core Curriculum Program at the American University in Cairo since 1990. Among his research interests are history of the transmission of Euclidean geometry in the medieval Mediterranean, history and editing of mathematical diagrams, and history of the printing of geometry textbooks in the Middle East.

# Abbreviations and Acronyms

ANL	Accademia Nazionale dei Lincei
APMEP/APM	Association des Professeurs de Mathématiques de l'Enseignement Public
CIEAEM	Commission Internationale pour l'Étude et l'Amélioration de l'Enseignement des Mathématiques
CIEM	Commission Internationale de l'Enseignement Mathématique
CTS	Committee on the Teaching of Science
Fondo Delessert	Fondo André Delessert, Biblioteca Speciale di Matematica "Giuseppe Peano," Torino
Fonds de Rham	Université de Lausanne
EARCOME	East Asian Regional Conference on Mathematics Education
<i>EM</i>	<i>L'Enseignement Mathématique</i>
<i>ESM</i>	<i>Educational Studies in Mathematics</i>
HPM	History and Pedagogy of Mathematics
IA	Archives of the International Mathematical Union (section of ICMI), Berlin
IACME/CIAEM	Inter-American Committee on Mathematical Education (in Spanish, Comité Interamericano de Educación Matemática)
ICM	International Congress of Mathematicians
ICME	International Congress on Mathematical Education
<i>ICMI Bulletin</i>	<i>ICMI Bulletin of the International Commission on Mathematical Instruction</i>
ICSU	International Council of Scientific Unions
<i>IMN</i>	<i>Internationale Mathematische Nachrichten</i>
IMU	International Mathematical Union
<i>IMU Bulletin</i>	<i>Bulletin of the International Mathematical Union</i>
IMUK	Internationale Mathematische Unterrichts-Kommission
IOWO	Instituut voor de Ontwikkeling van het Wiskunde Onderwijs
IUCST (CIES)	Inter-Union Commission on the Teaching of Science (in French, Commission Interunions de l'Enseignement des Sciences)
NCTM	National Council of Teachers of Mathematics

NUG	Niedersächsische Staats- und Universitätsbibliothek Göttingen
OEEC (OECD)	Organisation for European Economic Co-operation, later Organization for Economic Co-operation and Development
PME	Psychology of Mathematics Education
RBML	Rare Book & Manuscript Library, Columbia University, New York
SCOTS	Special Committee on the Teaching of Science
SEACME	Southeast Asian Conference on Mathematics Education
SEAMS	Southeast Asian Mathematical Society
SMSG	School Mathematics Study Group
UNESCO	United Nations Educational Scientific and Cultural Organisation
<i>ZDM</i>	<i>The International Journal on Mathematics Education</i>
(?)	word with uncertain decipherment
(...)	missing or damaged text
[ ]	addition by the editor
//	end of page of the manuscript
a. u.	archival unity
cit.	cited reference
del.	deleted
n. d.	no date
n. n. p.	not numbered page
n. p.	no place
transl.	translation

# Part I

## ICMI 1908–2008

### 1.1 Introductory Note

In this part of the volume, four chapters retrace the various stages of the Commission's life over its hundred years of history, through the analysis of published and unpublished sources. In this century of life, we have singled out three main periods:

- Foundation and the early period up to WWI;
- Rebirth in 1952 as a permanent subcommission of the International Mathematical Union (IMU) down to Freudenthal's innovations;
- “Renaissance” in the late 1960s and further development up to 2008.

In Chap. 1, Gert Schubring describes the origins of the movement toward international cooperation, the establishment of an active network of mathematics educators, and the key figures in this period. The work of CIEM/IMUK is described, showing the problems in its constitution, its “golden period” in the years before WWI, and the friction due to this war, leading to its dissolution in 1920. The last part of the chapter deals with the ephemeral reconstitution of the Commission in 1928 until its “sleeping mode” from 1936 on. The whole chapter is based on a considerable number of archival sources.

Chapter 2 by Fulvia Furinghetti and Livia Giacardi analyzes the evolution of ICMI after its establishment in 1952 as a subcommission of IMU. The changes in society and research, and movements such as New Math, made the need evident for new paradigms for approaching the problems of mathematical instruction. The collaboration with international bodies such as UNESCO and OEEC/OECD fostered new initiatives all around the world. The three main lines of investigation chosen to study the history of ICMI in the 20 years after WWII concern the following aspects: relationships between IMU and ICMI, which often resulted in relationships between professional mathematicians and educators; the emergence of mathematics education as an autonomous field of research; and the change in the objectives of ICMI. These aspects affected in a transversal way the work of the various Executive Committees that came one after another in this period. However, it was only under

the presidency of Freudenthal, who launched two important initiatives – a journal and a tradition of conferences specifically dedicated to mathematics education – that the concomitance of these three aspects ushered in a new season for ICMI. This chapter is largely based on the unpublished documents presented in Chap. 4.

In Chap. 3, Marta Menghini outlines the life of ICMI after Freudenthal's important and innovative initiatives. One of these was the creation of the *International Congresses on Mathematical Education* (ICMEs). Since 1969 these congresses have marked the life of ICMI: they have given voice to ICMI's Executive Committee, its president, and its secretary and also featured the principal topics and actors within mathematics education from an international perspective. Each congress has become an important date in the life of researchers, teachers, and people involved in various ways in mathematics education. In this chapter, the evolution of ICMI is analyzed through a study based on the proceedings of successive ICMEs. Oral interviews released by prominent actors on the ICMI scene provide further information on this period of consolidation of the Commission and creation of new trends in mathematics education research.

In Chap. 4, Livia Giacardi presents a wide selection of unpublished letters and documents (69) belonging to the period 1952–1974, from different archives, especially from the IMU Archive. The purpose is—through the voice of the protagonists—to highlight unknown or lesser-known aspects of the ICMI history, for example, the not always harmonious relations between ICMI and IMU and the internal dynamics of the Commission, and also to discover the motivations behind certain actions.

# Chapter 1

## The History of ICMI: The First Phase as IMUK and CIEM



Gert Schubring

### 1.1 Introduction<sup>1</sup>

One does not need to give a lengthy explanation of the importance of ICMI—International Commission on Mathematical Instruction<sup>2</sup>—for the development of mathematics education worldwide. Having survived several profound crises is already a significant sign for the need of such an organisation. Moreover, the results achieved confirm its role for the internationalisation of the national communities hitherto without an effective communication and interaction.

Yet, in proposing and founding this international organisation, nothing foreshadowed any long-standing activity – or even a well-structured body. The task given was a rather usual one, namely to prepare reports for the next International Congress of Mathematicians, four years later. The first aim of this chapter will be, hence, to show how the change came about. And the other one will be to show the development and the successes, as well as the problems encountered – until World War II.

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<sup>1</sup>This chapter is based on two earlier, but largely revised papers (Schubring 2003; Schubring 2008).

<sup>2</sup>Actually, this name in English dates only from the 1950s. Originally, there appeared only one official name, in French, due to the language of the first published document about the work of the Commission (Klein et al. 1908): *Commission Internationale de L'Enseignement Mathématique*, soon abbreviated as CIEM. Since Klein as president used always the German language in his correspondence, his naming and abbreviation became commonly used, too: *Internationale Mathematische Unterrichts-Kommission*, IMUK. Although this first document defined four official languages for the work of the Commission—English, French, German and Italian (ibid., p. 450)—names in English and in Italian were used only by the subcommissions of the United States and Italy.

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## 1.2 Preparing and Founding

One uses to recall that the first idea to create the Committee had been launched by David Eugene Smith (1860–1944),<sup>3</sup> in the journal *L'Enseignement Mathématique* (hereafter EM), founded in 1899 by the French mathematician Charles-Ange Laisant (1841–1920) and the Swiss mathematician Henri Fehr (1870–1954). Actually, this was not only the first international activity for mathematics teaching, the journal had also a decisive role in instigating Smith's proposal. Looking with more care into this primary impulse and in Smith's reaction, one remarks that the journal's initiative had a quite specific objective – not identical with the objectives later on decided for the Commission.

There was a note published by the two editors in 1905, which was due to a concern about the relation between pure and applied sciences, and this basically in the context of higher education, as is shown in particular by the first and the last of the three questions put by the editors to the readers of the journal:

1. What progress needs to be achieved in the organisation of the teaching of pure mathematics?
3. How should teaching be organised in such a way as to meet the requirements of pure and applied sciences better than in the past? (quoted apud Furinghetti 2003, p. 38).

One remarks, thus, that Smith's proposal was an answer to the first question, considering not mathematics teaching in general, but regarding improving the teaching of pure mathematics:

The best way to reinforce the organisation of the teaching of pure mathematics would be the establishment of a committee appointed by an international Congress and which would study the problem in its entirety (quoted in the translation by Schubring 2003, p. 54).

In the pedagogical section of the International Congress of Mathematicians (ICM) at Rome, in 1908, Smith presented his contribution about the teaching of mathematics at secondary schools in the United States,<sup>4</sup> and after that he added an extended and revised version of his proposal of 1905, listing nine issues. Now, it was a general proposal, no longer focussed upon the relation between pure and applied aspects. This proposal is barely known and will hence be documented here, since it makes to understand Smith's original concrete ideas and how this relates to the later practice:

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<sup>3</sup>See the biography of Smith in this volume.

<sup>4</sup>Smith had presented a second contribution in the same section on philosophical, historical, didactical questions (questioni filosofiche, storiche, didattiche) in its history subsection, on The Ganita-Sâra-Sangraha of Mahâvirâcârya.

### **Questions for the Considerations of Such Congresses as This**

And now, in closing, I should like to express the hope that these International Congresses may add to their already great value as clearing houses of thought, by sometime investigating, through committees, a few questions relating to secondary education. Countries cannot be uniform in their curricula, their school systems, nor their methods of teaching, but the influence of a Congress like this might greatly help many who are earnestly seeking to improve the teaching of mathematics. Some of the questions that might profitably be considered are the following:

1. What have been the results of attempting to remove the barrier between such topics as algebra and geometry, or to teach the two simultaneously, and are we prepared as yet to make any recommendation in this matter?
2. What have been the results of attempting to teach demonstrative geometry before algebra? If they have been favourable, what is the nature of the geometry best adapted to this apparently psychological sequence?
3. What is the opinion of impartial observers of the work of the MÉRAY geometry in France and of works like that of DE PAOLIS in Italy, as to the union of plane and solid geometry?
4. What is done in the various countries as to the union of plane geometry and trigonometry?
5. What is being done to advantage in the introduction of the elementary ideas of the calculus into the work in secondary algebra?
6. What is the safe minimum of Euclidean geometry, the calculus, and mechanics?
7. What is the safe relation to be established between secondary mathematics and physics?
8. What position should the secondary schools take with respect to the nature of applications and the relations of applied to pure mathematics?
9. What should be the relative nature of the courses in the secondary schools for those who do not intend to proceed to the universities, and for those who do intend to do so? In other words, of finishing and preparatory courses?

These questions, and others like them, are occupying the serious thought of American teachers. As we have always turned to Europe for conservative but helpful suggestions, so some of us would be glad if this Congress might deem it advisable to appoint international committees, corresponding in any of the four languages admitted to these deliberations to consider matters of this kind. An agreement is not essential, but the interchange of views and suggestions could not fail to be very helpful (Atti 1909b, p. 476–477).

All the issues concerned the teaching of mathematics in secondary schools, and mainly curricular issues. The relation between pure and applied aspects constituted one among other issues, without particular emphasis. Some of the later reform issues were addressed: the issue of fusion between algebra and geometry, and between plane and solid geometry – even the introduction of the elements of the calculus. The issue of rigour, later one of the IMUK studies, was addressed by issue

no. 2. The issue of relations between secondary and higher education was contained, as no. 9. On the other hand, the then much debated questions of reforming teaching methods such as the Perry movement and the laboratory method were not included.

One remarks the modest style of Smith's proposals: he suggested, even quite timidly, to establish various committees to discuss the different issues – emphasising: just for discussions and exchanges, but no joint actions were implied, and not one well-organised international body. Furthermore, one remarks a discrepancy: the final vote was to establish the Committee during the same Congress – whereas Smith had left it open, proposing the establishment of committees in his contribution, written before the ICM, at “congresses as this [one]”; and Lietzmann had explicitly told that Smith, in his oral summary of the printed contribution, proposed to establish the Committee—now already as just one—at the next congress (“auf dem nächsten Kongreß”; Lietzmann 1908, p. 83). One has to infer that it was the dynamic initiated by Smith's oral talk which led to Archenhold's formulation, to create one committee, and right now.

It is not well-known, however, that the founding almost failed, due to the machinations of a German participant, himself committed to mathematics education. At first, all seemed to work well. The imminent failure of Smith's proposal, however, is clear from Eileen Donoghue's PhD thesis of 1987 devoted to Smith's actions in promoting mathematics education as an academic discipline. In the fourth section of the Congress, on 9 April, while the German astronomer Friedrich Simon Archenhold (1861–1939) was presiding, Smith presented his paper and proposed establishing the international committee – yet, Archenhold's summarising shows a decisive difference from the later decision that the committee should be “permanent”:

Prof. Archenhold, supporting an idea already expressed by Prof. Smith in his communication, proposes that a permanent committee be established for studying questions concerning the teaching of mathematics in the secondary schools. (Atti 1909a, p. 45).<sup>5</sup>

In fact, Archenhold favoured the proposal and took the vote which passed.<sup>6</sup> Nevertheless, Smith thought it necessary to have the proposal reconfirmed at the last meeting of the fourth section, on 11 April. Then, however, the presider was the German mathematics teacher and educator Max Simon (1844–1918). Simon, as Donoghue reports, “was one of the few who voiced an objection to Smith's proposal.” She observes, “While Smith and his supporters were in the lobby discussing manoeuvres, Simon adjourned the meeting” (Donoghue 1987, p. 267).

Because it was the last meeting of the section, Smith's proposal would have been postponed until the next Congress, four years later! Donoghue reports how Smith prevented the premature death of his idea by tricky dealing with standing orders:

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<sup>5</sup>The original text is: “Il Prof. ARCHENHOLD, in appoggio a un'idea già espressa dal Prof. SMITH nella sua Comunicazione, propone che sia istituito un Comitato permanente per lo studio delle questioni riguardanti l'insegnamento della Matematica nelle scuole secondarie.”

<sup>6</sup>“La proposta è accolta favorevolmente dalla Sezione” (The proposal is approved by the Section) (Atti 1909a, p. 45).