

# FROM ROME TO ROME: EVENTS, PEOPLE, AND NUMBERS DURING ICMI'S FIRST CENTURY

**Fulvia FURINGHETTI\*, Livia GIACARDI\*\***

\*Dipartimento di Matematica dell'Università, Genova, Italy

\*\*Dipartimento di Matematica dell'Università, Torino, Italy

\*furinghe@dima.unige.it, \*\*livia.giacardi@unito.it

## ABSTRACT

On the occasion of the ICMI centenary the authors of the present paper have built the website “The first century of the International Commission on Mathematical Instruction (1908-2008). History of ICMI”, which contains information and documents about people, events, and bodies intervening in the first century of this Commission.

Working on this enterprise offered an occasion for reflecting on some aspects of ICMI history, in particular, on how the key ideas (internationalization, communication, solidarity) that inspired its founding were realized, as well as on contributions by paramount ICMI members to the evolution of both the Commission's policies and its methodological approaches to problems.

## 1 Introduction

In 1908, during the fourth International Congress of Mathematicians held in Rome, a commission aimed at studying the problems of mathematical instruction at an international level was founded. Through successive events and changes this commission developed into the body now known as ICMI (International Commission on Mathematical Instruction).<sup>1</sup> A hundred years later, the first centenary of the Commission was celebrated at a Symposium during which about 200 scholars from all around the world gathered in the same sites where ICMI was founded. The celebrations provided a good occasion for revisiting ICMI history through talks centered on particular moments in the history of the Commission. The texts of these talks, reported in the proceedings of the Symposium (Menghini et al., 2008), add further information to the existing works in the field.<sup>2</sup> In the aftermath of this event further publications have appeared: the special issue of the *International Journal for the History of Mathematics Education*, the Regular lecture (Arzarello et al., to appear) delivered at ICME-11, some contributions in the Iceland conference on the history of mathematics education (see Bjarnadóttir, Furinghetti, Schubring, 2009).

The website entitled “The first century of the International Commission on Mathematical Instruction (1908-2008). History of ICMI”,<sup>3</sup> designed by the authors of the

---

<sup>1</sup>The name “International Commission on Mathematical Instruction” and acronym ICMI that we use in this paper exist from the early 1950s. Earlier, the Commission was known by the French acronym CIEM (Commission Internationale de l'Enseignement Mathématique) or, especially under Klein's presidency, by the German acronym IMUK (Internationale Mathematische Unterrichtskommission).

<sup>2</sup>General information on ICMI is in (Bass, Hodgson, 2004). The history of the first 75 years of ICMI is outlined in (Howson, 1984). In his book on the history of the International Mathematical Union (IMU), Lehto (1998) illustrates aspects of ICMI history, with particular reference to its relationship to the community of mathematicians. The early days of ICMI and the conditions for its creation are presented in (Furinghetti, 2003; Schubring, 2008). For general information on ICMI see the ICMI website: <http://www.mathunion.org/ICMI/>.

<sup>3</sup>See (Furinghetti, Giacardi, 2008).

present paper, is intended as a useful complement to the reconstruction of the history of ICMI. Besides offering a timeline of the events and cameos of the main figures, it presents a large and rich selection of documents, which are often difficult to find.

In this paper we briefly illustrate the six sections of the website and use the materials to review some aspects of the history of ICMI.

## 2 The website for the history of ICMI

The historical roots of ICMI can be traced to a suggestion by David Eugene Smith (1905) that appeared in the journal *L'Enseignement Mathématique*<sup>4</sup> (hereafter “EM”), founded in 1899 by two mathematicians, the French Charles-Ange Laisant and the Swiss Henri Fehr. Smith advocated more international co-operation and the creation of a commission to be appointed during a conference for the study of instructional problems at an international level. As mentioned earlier, this project was realized in 1908 during the fourth International Congress of Mathematicians held in Rome (6-11 April 1908), when ICMI was founded. It is important to note that the Commission was founded and developed inside the community of mathematicians and for a long time the mandates were established each four years during the International Congress of Mathematicians. In what follows we will see that this fact affected the course of ICMI.

In the century of ICMI’s existence it is possible to identify five periods, outlined below, that were the result of both external events that influenced the Commission as well as the changing centers of interest and activities of the Commission itself.

### 1. Foundation and early period up to WWI (President: Felix Klein)

	Fasc. ou volumes.	Nombre de rapports.	Nombre de pages.
Comité Central.	11	19	561
Allemagne . . . . .	53	53	5571
Rép. Argentine. . . . .	1	1	24
Australie . . . . .	1	6	79
Autriche. . . . .	13	12	776
Belgique. . . . .	2	5	366
Danemark . . . . .	1	10	107
Espagne . . . . .	3	10	165
Etats-Unis . . . . .	18	18	1499
France . . . . .	5	45	674
Hollande . . . . .	1	13	151
Hongrie . . . . .	9	9	294
Iles Britanniques . . . . .	32	39	921
Italie . . . . .	10	11	268
Japon . . . . .	2	16	788
Roumanie . . . . .	1	1	16
Russie . . . . .	7	11	295
Suède . . . . .	8	8	229
Suisse . . . . .	9	13	781
	187	310	13565

Figure 1. Publications of the Commission (Fehr, 1920-1921, p. 339).

<sup>4</sup>After the foundation of ICMI, *L'Enseignement Mathématique* became the official organ of the Commission.

During this phase an important international network of national subcommittees was established for the preparation of reports on the state of mathematical instruction as well as on thematic issues. The account by Fehr (1920-1921) on the activity of the Commission from 1908 to 1920 encompasses an impressive list of the publications of the Central Committee and of the national sub-commissions (Argentina, Australia, Austria, Belgium, Denmark, France, Germany, Holland, Hungary, Italy, Japan, Romania, Russia, Spain, Sweden, Switzerland, UK, and USA). During this period nine international inquiries on different aspects of mathematics teaching were launched through questionnaires, followed by the relative reports, with the exception of the last inquiry concerning teacher education, presented only in 1932 because of WW1 and the ensuing political problems.<sup>5</sup>

## *2. Crisis and dissolution in 1920-21 and ephemeral rebirth in Bologna 1928 between the two World Wars (Presidents: David E. Smith, Jacques Hadamard)*

After WW1 scientific associations dissolved and the shocking decision was made to ban the researchers of the Central Powers from most international activities. In Rome, Schubring (2008) provided a vivid picture of the obstacles to cooperation, and the political pressures that resulted in the dissolution of the Commission after WW1, underlining the role of the secretary<sup>6</sup> Fehr. Only during the International Congress of Mathematicians in Bologna (1928) would international collaboration be re-established, reintegrating the countries that had been excluded. However, the reconstituted Commission for mathematics teaching was not capable of producing new ideas and projects, and was limited to carrying out the old agenda, until WW2 forced a second arrest of activities.

## *3. The rebirth in 1952 as a permanent sub-commission of the IMU (Presidents: Albert Châtelet, Heinrich Behnke, Marshall Stone, André Lichnérowicz)*

As reported in the short history in the IMU website (<http://www.mathunion.org>) “the Constitutive Convention in 1950 in New York created IMU *de facto*. By the Statutes adopted there, IMU came into being in 1951 *de jure*”. During the first General Assembly held in Rome in 1952 the Commission became a permanent sub-commission of IMU, while maintaining its original aims, but friction between IMU mathematicians and ICMI very soon made it necessary to better define ICMI’s structure (composition, relationship with the IMU, the organization of the national sub-commissions, etc.). Precise Terms of Reference<sup>7</sup> were adopted during the second General Assembly of IMU (The Hague, 31 August-1 September 1954). Behnke was to play an important role in this period. In the 1960s the action of ICMI broadened considerably: thanks to Stone and Lichnérowicz, collaborations both scientific and organizational were established with other associations such as OEEC (Organization for European Economic Cooperation) and UNESCO (United Nations Educational Scientific and Cultural Organization). These led to a greater internationalism and to the organization of numerous thematic congresses in various parts of the world. After WW2 lines of research broadened and new approaches to mathematics

<sup>5</sup>See *Questionnaires and reports* in (Furinghetti, Giacardi, 2008).

<sup>6</sup>The term “secretary general” was used in the first few decades of the ICMI, and became “secretary” after the WW2. In the meeting of April 2002 in Paris new Terms of Reference for ICMI were approved by the Executive Committee of IMU: among the modifications there is a change in the name of the position of “secretary”, which is now designated by the term “secretary general”, as it was in the past.

<sup>7</sup>The successive Terms of Reference of ICMI from 1954 to 2002 are in (Giacardi, 2009) and on the ICMI website <http://www.mathunion.org/icmi/home/>

education were carried out in different arenas. In the USA the *University of Illinois Committee on School Mathematics* (UICSM), headed by Max Beberman, was established in 1951. In 1958 the School Mathematics Study Group (MSG) was created under the directorship of Edward G. Begle<sup>8</sup>, a member of the ICMI Executive Committee from 1975 to 1978. In Europe CIEAEM (*Commission Internationale pour l'Étude et l'Amélioration de l'Enseignement des Mathématiques*), which had already begun its activities in 1950, was officially founded in 1952. This Commission, whose members included mathematicians, pedagogists, secondary teachers, psychologists, and epistemologists, focused mainly on the importance of working in the field of didactic research while maintaining close contacts with the classroom. As discussed in (Furinghetti et al., 2008), CIEAEM was particularly influential in the evolution of ICMI's approach to educational problems. As a matter of fact, some of the founding members of CIEAEM were important members of ICMI Executive Committee (Evert W. Beth,<sup>9</sup> Hans Freudenthal, Lichnérowicz). One of the most debated themes in this context was the approach proposed by the movement of Modern/New Mathematics. This movement did not have the desired effects in the mathematical instruction of the various countries, but promoted the circulation of ideas at an international level as well as attempts to modernize the teaching of mathematics in different directions, see (Charlot, 1984; Corry, 2007; Walmsley, 2003). Here we cite only a few of these initiatives. The *School Mathematics Project* (1961) and the Nuffield Project for mathematics (1964) were launched in the UK. The book *Mathématique moderne* by Georges and Frédérique Papy appeared in 1963. This ferment led to the rapid increase in the number of mathematics educators and provided a significant impulse to activities that would develop further during the next period (see below).

#### 4. *The Renaissance in the late 1960s and consolidation (Presidents: Hans Freudenthal, Michael James Lighthill, Shokichi Iyanaga, Hassler Whitney)*

Changes in the needs of mathematics education went hand in hand with changes in society. Freudenthal, president in the years 1967-1970, realized that the earlier trends of ICMI activities were no longer suitable to meet these changing needs. Once again the relationship with the community of mathematicians was strained, and Freudenthal contrived to act independently from them in launching two important initiatives that revitalized the Commission: the founding of the new journal *Educational Studies in Mathematics* (1968), explicitly devoted to mathematics education, and the establishment in 1969 of the tradition of a periodic International Congress on Mathematical Education (ICME). Mathematics education was growing as an autonomous discipline, supported by important international and national initiatives that make evident the ferment of those years. Two new journals soon appeared: in 1969 the German *Zentralblatt für Didaktik der Mathematik* (now *ZDM – The International Journal on Mathematics Education*), and in 1970 the USA *Journal for Research in Mathematics Education*. In 1968 the *Zentrum für Didaktik der Mathematik* (Center for the didactics of mathematics) was founded in Karlsruhe by Hans George Steiner and Heinz Kunle, followed in 1973 by the IDM (Institut für Didaktik der Mathematik) founded in Bielefeld by Steiner with Michael Otte and Heinrich Bauersfeld. In 1969 the first IREM (Institut de Recherche sur l'Enseignement des Mathématiques) was established in Paris. In 1967 the Nordic

<sup>8</sup>See Jeremy Kilpatrick's cameo in (Furinghetti, Giacardi, 2008).

<sup>9</sup>See Giorgio T. Bagni's cameo in (Furinghetti, Giacardi, 2008).

Committee for the Modernisation of School Mathematics (Denmark, Finland, Norway and Sweden) presented a new syllabus inspired by New Math. Among the best-known members of this Committee was Bent Christiansen (Denmark). In the early 1970s the *Collaborative Group for Research in Mathematics Education* was established at the University of Southampton Centre for Mathematics Education: Geoffrey Howson and Bryan Thwaites were among its collaborators. In 1971 Freudenthal himself founded the *Institut Ontwikkeling Wiskunde Onderwijs* (IOWO, Institute for the Development of Mathematics Teaching). It is remarkable that members of ICMI executive committee are among the supporters of the various initiatives. During this period an important event for the history of mathematics education was the establishing of the first Study Groups affiliated with the ICMI during the third ICME in Karlsruhe (1976): HPM (*The International Study Group on the relations between the History and Pedagogy of Mathematics*) and PME (*International Group for the Psychology of Mathematics Education*).<sup>10</sup> Meanwhile the ICMI continued to organize or support international conferences, in particular in developing countries.

#### 5. *Gaining autonomy from IMU and new trends in ICMI action (Presidents: Jean-Pierre Kahane, Miguel de Guzmán, Hyman Bass, Michèle Artigue)*

In the most recent decades an important change in the relationship between mathematicians and mathematics educator has taken place. Many activities such as conferences and working sessions were organized, and publications were edited by the Affiliated Study Groups of ICMI.<sup>11</sup> In 1984 the ICMI Studies<sup>12</sup> were launched under the presidency of Kahane, with Geoffrey Howson as a secretary. The former tradition of international inquiries was resurrected with new paradigms: the Studies are launched through a Discussion Document published in *L'Enseignement Mathématique* and in other journals; researchers submit their contributions on the theme of the Study; on the basis of the contributions received the Program Committee delivers the invitations to the ICMI Study meeting; at the end, a book (the ICMI Study volume) is published to disseminate the results. Successive presidents acted to promote further action in favor of developing countries and to strengthen independence from IMU. After the ICM-2006 held in Madrid, important changes were achieved. According to the Terms of Reference of 2007, the Executive Committee of ICMI is elected by the General Assembly of ICMI itself. Thanks to the changes in the Terms of References, which occurred for the first time in 2007, during ICME-11 (2008) the Executive Committee of ICMI for the period 2010-2012 was elected by the General Assembly of ICMI.<sup>13</sup>

The data and ample documentation on the website make it possible to go deeper into the story that we have delineated briefly here, and learn more about the protagonists, events, and official and non-official publications. The website contains the following sections: *Timeline*; *Portrait Gallery*; *Documents*; *The Affiliated Study Groups*; *The*

<sup>10</sup>For the history of the Study Groups, see the section *The Affiliated Study Groups* in (Furinghetti, Giacardi, 2008).

<sup>11</sup>New groups were created: in 1987 IOWME (*The International Organization of Women and Mathematics Education*), in 1994 WFNMC (The World Federation of National Mathematics Competitions), in 2003 ICTMA (The International Study Group for Mathematical Modelling and Applications).

<sup>12</sup>See the section *The ICMI Studies and Study Volumes: The past Studies - Studies in progress* in (Furinghetti, Giacardi, 2008).

<sup>13</sup>See <http://www.mathunion.org/icmi/about-icmi/icmi-as-an-organisation/terms-of-reference/>

*International Congresses on Mathematical Education; Interviews and Film Clips.*

- The *Timeline* is organized on two levels divided in nine periods, with the first level showing the most significant events, and the second adding further details. The aim of this section is to identify the most important moments in the history of ICMI (people, congresses, interactions with other entities, etc.). Each fact is amply documented, with references to the original sources, in particular to *L'Enseignement Mathématique* with links to its website, to the official publications of the Commission, to the *Internationale Mathematische Nachrichten*, to the *ICMI Bulletins*, and to all other documentation that was deemed of interest. Many images, photos and quotations by the protagonists have been inserted. It ends in 1976, when the first Affiliated Study Groups of ICMI were created and activities on mathematics education developed in many different directions. The *ICMI Bulletins*, started in 1972 and available on the website, provide the most important information and news is continually updated on the ICMI website.

- The *Portrait Gallery* contains the complete list of ICMI officers,<sup>14</sup> and cameos (53) of the officers who passed away during the period 1908-2008, of those awarded honorary membership during the International Congress of Mathematicians in Oslo (1936), and of other figures who occupy an important place in the ICMI history, such as Charles-Ange Laisant, one of the founders of the journal *L'Enseignement Mathématique*, the official publishing organ of ICMI since 1908. Precise criteria were used in compiling the biographies so as to respect the nature and aims of the website. The goal was to make evident each person's role within the ICMI, the contributions to research on the problems of teaching, and the publications expressly dedicated to education.

As far as possible the authors of the contributions to this section were chosen from among colleagues from the country of the officer concerned.

- At present, the section dedicated to *Documents* contains: the publications of the Central Committee, with links to digitalized versions in pdf format; the texts of the questionnaires used during inquiries and the relative reports; the list of the ICMI Studies and of the relative volumes; the *ICMI Bulletins*, with links to the digitalized versions; the successive Terms of Reference of ICMI and the list of the documents held in the ICMI Archives.<sup>15</sup>

- The section dedicated to *Affiliated Study Groups* (HPM, ICTMA, IOWME, PME, and WFNMC) presents their histories beginning with their creation, in some cases supplemented by an ample photo gallery.

- The section *The International Congresses on Mathematical Education (ICME)* lists the ten congresses that have taken place up to 2008 and offers general information about each of them, with bibliographical references for the *Proceedings* and their contents, and the *Resolutions of the Congress*.

- The section *Interviews and Film Clips* is dedicated to the testimony of some of the protagonists of the history of the ICMI – Emma Castelnuovo, Trevor Fletcher, Geoffrey

---

<sup>14</sup>From 1908 to WW2 ICMI was ruled by a Central Committee consisting of the president, one or more vice-presidents, a secretary-general, co-opted members or members-at-large. When ICMI was reconstructed in 1952 it was ruled by an Executive Committee consisting of the president, two vice-presidents, a secretary (later secretary-general), members-at-large, and ex officio members. In different periods the ex officio members were past presidents of ICMI, presidents of IMU, secretaries of IMU, representatives of IMU in CTS (Committee on the Teaching of Science) /ICSU (International Council of Scientific Unions).

<sup>15</sup>The documents referring to ICMI are in the folders 14 A-G of the IMU files stored at the central Archives of the University of Helsinki. Here we refer to them as "ICMI Archives".

Howson, Maurice Glaymann, Jean-Pierre Kahane, Heinz Kunle, André Revuz, Bryan Thwaites – who describe, through their own experiences and the people they knew, little known aspects of this history.

### **3 Numbers regarding internationalization, communication, and solidarity in ICMI history**

We have seen that the idea of a Commission studying problems of mathematical instruction in different countries germinated in the pages of the journal *L'Enseignement Mathématique*. The vision and mission of this journal – internationalism and the related ideas of communication and solidarity – were inherited by the Commission. To follow how internationalism was realized in the various periods we consider the network of the nations involved in the enterprise during ICMI's first century.

At the beginning the Commission was made up of delegates from countries which had participated in at least two International Congresses of Mathematicians with an average of at least two members. They were: Germany, Austria, Belgium, Denmark, Spain, France, Greece, Holland, Hungary, Italy, Japan,<sup>16</sup> Norway, Portugal, Romania, Russia, Sweden, Switzerland, the British Isles, and USA (19 countries).<sup>17</sup> Each country had either one or three delegates.<sup>18</sup> These countries were joined by a number of “associated countries”, whose delegates were permitted to follow the activities of the Commission, without having the right to vote: Argentina, Australia, Brazil, Bulgaria, Canada, Chile, China, the Cape Colonies, Egypt, The Indian Raj, Mexico, Peru, Serbia and Turkey.

In 1952, when ICMI was transformed into a permanent sub-commission of IMU, the new Terms of Reference, adopted by the General Assembly of IMU in 1954 in The Hague, established that ICMI consisted of 10 members-at-large and two national delegates named by each National Adhering Organization of IMU. In 1955, of the 29 countries which were part of IMU<sup>19</sup> only 15 (to which 6 would be added soon) designated their two delegates.<sup>20</sup> The Indian Ram Behari was elected member of the Executive Committee of ICMI: he was the first officer from outside Europe and North America.

ICMI's mission of internationalization, communication and solidarity was strengthened in the following years in synergy with international organizations such as UNESCO and OEEC (now OECD); conferences and other activities were organized outside Europe. In the meeting of ICMI in Paris (14-15 February 1964) ICMI, in agreement with the President of the IMU, decided to acknowledge the actual status of national sub-commission to national Commissions representing countries which were not members of IMU.<sup>21</sup> This decision was immediately put into effect in the case of Luxemburg and successively in that of Senegal, making ICMI even more international.

As of 2010<sup>22</sup> there are 85 member countries of ICMI, 68 of which are also members of

---

<sup>16</sup>In (*EM*, 1908, 10, Rapport préliminaire) Japan was listed by mistake among the associated members. In (*EM*, 1911, 13, Circulaire n. 4) this country is declared to have the right to full membership.

<sup>17</sup> Here and elsewhere we report the names (translated into English) of the countries as they appear in *L'Enseignement Mathématique*. Changes in names, territories, and status of the countries occurred during the century in question.

<sup>18</sup>See (Giacardi, 2008; *EM*, 1908, 10, 445-458; *EM*, 1909, 11, 193-204).

<sup>19</sup>The member nations of IMU are listed in the Appendix 1 of (Lehto, 1998).

<sup>20</sup>See (Giacardi, 2008; *EM*, II s., 1955, 1, 195-198, *EM* II s., 1955, 1, 202).

<sup>21</sup>See (Giacardi, 2008; *EM*, II s., 1966, 12, 134).

<sup>22</sup>See *ICMI members* in <http://www.mathunion.org/icmi/about-icmi/members/>.

IMU, and 4 of which are associate members of IMU, a rather small number compared to the 192 member countries of United Nations (see Table 1).

Table 1. List of the 85 member countries of ICMI. (\*) indicates the 13 members of ICMI that are not members of IMU; (am) indicates associated members of IMU.

Argentina	Egypt	Republic of Korea	Saudi Arabia
Armenia	Estonia	Kuwait (*)	Senegal (*)
Australia	Finland	Kyrgyzstan (am)	Serbia
Austria	France	Latvia	Singapore
Bangladesh (*)	Georgia	Lithuania	Slovakia
Belgium,	Germany	Luxembourg (*)	Slovenia
Bosnia and Herzegovina	Ghana (*)	Malawi (*)	South Africa
Botswana (*)	Greece	Malaysia (*)	Spain
Brazil	Hong Kong	Mexico	Swaziland (*)
Brunei Darussalam (*)	Hungary	Mozambique (*)	Sweden
Bulgaria	Iceland	Netherlands	Switzerland
Cameroon	India	New Zealand	Thailand (am)
Canada	Indonesia	Nigeria	Tunisia
Chile	Iran	Norway	Turkey
China	Ireland	Pakistan	Ukraine
Colombia	Israel	Peru	United Kingdom
Costa Rica (*)	Italy	Philippines	United States of America
Croatia	Ivory Coast	Poland	Uruguay
Cuba	Japan	Portugal	Venezuela
Czech Republic	Kazakhstan	Romania	Vietnam
Denmark	Kenya (am)	Russia	Zambia (*)
Ecuador (am)			

The ICMI website provides the following information regarding the organization of ICMI:

Each state, whether an IMU country or not, is invited to appoint a Representative to ICMI, who acts as a liaison between ICMI and the mathematics education community in the country. Moreover every four years, the Representatives elect the ICMI Executive Committee during the ICMI General Assembly. In 16 countries (Australia, Belgium, Chile, Denmark, France, Germany, Japan, Korea, Mexico, New Zealand, Portugal, South Africa, Spain, Sweden, UK, USA) Sub-Commissions of ICMI have been established with two purposes. The first is to provide an organized local forum for dealing with issues of mathematics education and for exchange of information within the country. The second purpose is to offer an interface between the country and the international mathematics education community as represented by ICMI. The Sub-Commission includes among its members the Representative to ICMI, who is often the chairperson.

In recent decades the path towards true internationalization, communication and solidarity was marked by a particular attention to developing countries and with solidarity projects (see Hodgson, 2009 and Jaime Carvalho's cameo of De Guzmán in Furinghetti, Giacardi, 2008). Thus, formally the mission and vision of ICMI has been realized. However, an examination of the data provided on the website reveals a slightly different situation.

From 1908 to 2008 there were 107 ICMI officers<sup>23</sup> coming from 33 countries,<sup>24</sup> 24 of which are European, as can be seen in Table 2. Before WW2 only Europe, USA and Canada had officers. In 1955 an officer from Asia was appointed (the Indian Ram Behari);

<sup>23</sup>Some officers served for more than one mandate.

<sup>24</sup>The country attributed to the officers is that where they were mainly working when serving as ICMI officers.

in 1979 one from South America was appointed (the Brazilian Ubiratan D'Ambrosio); in 1979 one from Australia was appointed (Bernhard H. Neumann). Africa had its first officer in 2003 (Jill Adler). The movement towards internationalism was gradual. Further information concerning this is provided in the list of the presidents and the secretaries in Table 3.

Table 2. Number of officers per country

Argentina (1)	Finland (2)	Netherlands (3)	South Africa (1)
Australia (4)	France (12)	New Zealand (1)	Spain (2)
Austria (1)	Germany (5)	Norway (2)	Sweden (2)
Brazil (2)	Hungary (2)	Philippines (1)	Switzerland (6)
Bulgaria (1)	India (2)	Poland (2)	UK (8)
Canada (4)	Italy (4)	Portugal (1)	USA (14)
China and Hong Kong (3)	Japan (5)	Russia (4)	USSR (4)
Colombia (2)	Mexico (1)	Singapore (1)	Yugoslavia (1)
Denmark (3)			

Table 3. List of the presidents and the secretaries of ICMI

<i>Years</i>	<i>Presidents</i>	<i>Country</i>	<i>Secretary</i>	<i>Country</i>
1908-12	Felix Klein	Germany	Henri Fehr	Switzerland
1912-20	Felix Klein	Germany	Henri Fehr	Switzerland
1928-32	David E. Smith	USA	Henri Fehr	Switzerland
1932-36	Jacques Hadamard	France	Henri Fehr	Switzerland
1936-	Jacques Hadamard	France	Henri Fehr	Switzerland
1952-54	Albert Châtelet	France	Heinrich Behnke	Germany
1955-58	Heinrich Behnke	Germany	Julien Desforge	France
1959-62	Marshall H. Stone	USA	Gilbert Walusinski	France
1963-66	André Lichnérowicz	France	André Delessert	Switzerland
1967-70	Hans Freudenthal	Netherlands	André Delessert	Switzerland
1971-74	James Lighthill	UK	Edwin A. Maxwell	UK
1975-78	Shokichi Iyanaga	Japan	Yukiyoshi Kawada	Japan
1979-82	Hassler Whitney	USA	Peter Hilton	USA
1983-86	Jean-Pierre Kahane	France	A. Geoffrey Howson	UK
1987-90	Jean-Pierre Kahane	France	A. Geoffrey Howson	UK
1991-94	Miguel de Guzmán	Spain	Mogens Niss	Denmark
1995-98	Miguel de Guzmán	Spain	Mogens Niss	Denmark
1999-02	Hyman Bass	USA	Bernard R. Hodgson	Canada
2003-06	Hyman Bass	USA	Bernard R. Hodgson	Canada
2007-09	Michèle Artigue	France	Bernard R. Hodgson	Canada

The country which has had the largest number of presidents is France with 5 (one of whom had 2 mandates), followed by the USA with 4 (one of whom had 2 mandates). In only three cases were the country of the President and that of the secretary the same (UK for Lighthill and Maxwell, Japan for Iyanaga and Kawada, USA for Whitney and Hilton).

## 4 People in ICMI

ICMI activities fall into two categories: political (relationships with mathematicians, with governments, equity issues, policy for developing countries, etc.) and educational/instructional (curricula, inquiries, conferences, ICMI studies, teacher education and recruitment). The activities of ICMI are decided on by the Executive Committee (up to WW2 they were decided on by the Central Committee), but the main imprinting of ICMI's activity is generally due to the president or, in some periods, to the

synergy and impulse that derive from the duo of president-secretary. The kind of collaboration carried out by this duo varies according to the personality of the two officers involved, the historical moment, and the actions carried out. There are moments in which the secretary's role was limited to that of a mere executor of the president's resolutions.

Up to and throughout 2006 the officers of ICMI were appointed by mathematicians during their International Congresses. Appointments of members of the Central/Executive Committee, especially the positions of president and secretary, have often been influenced by political issues. First, because the officers were appointed by the mathematicians, it was necessary for them to reach a certain agreement. Second, due to the international character of the Commission, a geographical balance of representation was hoped for (though in fact this was not always achieved). Moreover the twentieth century suffered two large blights during the two world wars and the post-war periods that followed them. It is understandable that a certain caution was exercised in choosing the officers in order to ease the situations.

The reasons underlying the choice of Felix Klein as president and Henri Fehr as secretary at the founding of ICMI in Rome are rather obvious. Felix Klein<sup>25</sup> was one of the most prominent mathematicians of his day, and enjoyed an international reputation; moreover, his commitment to education (reforming of curricula and teacher education) was acknowledged worldwide. His organizational and scientific contributions are illustrated in Schubring's cameo in (Furinghetti, Giacardi, 2008) and in (Schubring, 2003; Schubring, 2008), so here we limit ourselves to mentioning that not only did he manage to create a genuine international network, but he also directed the Commission's efforts to study the two topics that corresponded to the two main issues in his reform agenda: the introduction of the concept of function and elements of differential and integral calculus into the upper years of middle school, and the role of mathematics in higher technical instruction.<sup>26</sup> Henri Fehr<sup>27</sup> was one of the founders of *L'Enseignement Mathématique*, the journal that played an important role in the emergence of international communication in the sector of education, and he strongly supported the idea of international studies on curricula. He was an untiring organizer of the Commission until his death in 1954.

In the years that followed the Commission's founding, the appointment of presidents and secretaries was inspired by various criteria. With the exceptions of David E. Smith and Michèle Artigue, all presidents have been university professors primarily involved in mathematical rather than in educational research. Nevertheless, they also showed genuine interest in mathematics education and addressed this subject in their writings. The cameos featured on our website, which also focus on the educational contributions of these figures, offer significant insights on this point. In what follows we will provide some notes on the activities of the presidents no longer living in order to show their contributions to ICMI in terms of organization as well as their contributions to educational problems. We will also mention some of the secretaries who actively contributed.

As mentioned before, Smith (1928-1932) was not a professional mathematician, but he nevertheless enjoyed excellent contacts with mathematicians, serving from 1902 until 1920 as an associate editor of the *Bulletin of the American Mathematical Society* and from 1916 on as associate editor of *The American Mathematical Monthly*. His publications were

---

<sup>25</sup>See Gert Schubring's cameo in (Furinghetti, Giacardi, 2008).

<sup>26</sup>See the report on the ICMI congress in Paris (1-4 April 1914) in (*EM*, 1914, 16, 245-356).

<sup>27</sup>See Gert Schubring's cameo in (Furinghetti, Giacardi, 2008).

decisive in shaping mathematics education in the United States. The books *The Teaching of Elementary Mathematics* (1900), *The Teaching of Arithmetic* (1909), and *The Teaching of Geometry* (1911), concerning methodological and didactical aspects of teaching, are directed to the professional formation of teachers. His textbooks in arithmetic, algebra, and geometry and accompanying handbooks, published since 1904, were dominant during the 1910s.<sup>28</sup>

Jacques Hadamard, president from 1932 until WW2, was one of the top mathematicians of his day. His academic life was full of obligations that clashed with ICMI duties (for example, in 1936 he did not report on the work of the Commission because he was in China). He wrote textbooks, essays and articles about mathematics teaching and made an important indirect contribution to mathematics education through his famous book, *An Essay on the Psychology of Invention in the Mathematical Field* (1945, Princeton NJ: Princeton University Press, with many editions), in which he draw attention to the role of psychology in mathematical activity. During his presidency he benefitted from the experience and passionate involvement of two experienced officers, Walther Lietzmann and Fehr.

Albert Châtelet (1952-1954) contributed to the study of topics such as the laboratories of mathematics and the use of concrete materials. He collaborated with Jean Piaget on a well known book on introducing children to arithmetic.<sup>29</sup> As *Directeur de l'Enseignement du second degré* he worked for the modernization of the educational system in France. Moreover he was actively involved in French politics (see Condette, 2009). Probably for this reason during his mandate the Commission's activities were largely overseen by the secretary Behnke.<sup>30</sup>

Marshall Harvey Stone<sup>31</sup> was ICMI president from 1959 to 1962, during the period of the heated discussion about Modern Mathematics, when new curricula were launched in the US and Europe. Stone chaired the milestone meeting in Royaumont (23 November - 4 December 1959). On that occasion he formulated a veritable "program of research in the teaching of mathematics" (study and experimentation), expressing his hopes for the creation of ad hoc institutes for research and the insertion of research projects regarding the teaching of mathematics into universities. He pointed out that teaching must address problems concerning mass education, meet the needs of applications, adjust to society's increasingly urgent demand for the services of scientists, and devise new methodologies. He also stressed the exigency of not widening the gap between school mathematics and university mathematics.<sup>32</sup> During his mandate ICMI co-sponsored important international meetings<sup>33</sup> with the collaboration of OEEC and UNESCO. He was flanked by secretary

---

<sup>28</sup>See Gert Schubring's cameo in (Furinghetti, Giacardi, 2008).

<sup>29</sup>See Piaget, J., Boscher, B., Châtelet, A., 1949, *Initiation au calcul. Enfants de 4 à 7 ans*, Paris: Bourrelrier.

<sup>30</sup>See Gert Schubring's cameo in (Furinghetti, Giacardi, 2008). The ICMI Archives (14 A, 1952-1954) show that Châtelet did not play a very significant role during his mandate, and this is confirmed by the documentation held in the French archives examined by J.-F. Condette, who we thank for this information.

<sup>31</sup>See Jeremy Kilpatrick's cameo in (Furinghetti, Giacardi, 2008).

<sup>32</sup>See *New Thinking in School Mathematics*, OEEC, 1961, pp. 28-29.

<sup>33</sup>We mention for example: *Symposium on The teaching of Geometry in Secondary School* (30 May - 2 June 1960) in Aarhus (Denmark); *Symposium on The Co-ordination of the Teaching of Mathematics and Physics* (19-24 September 1960) in Belgrade (Yugoslavia); *Seminar on the teaching of analysis and relative manuals* (26-29 June 1961) in Lausanne; Seminar on A discussion of the Aarhus and Dubrovnik reports on the teaching of geometry at the secondary level (4-8 October 1961) in Bologna (Italy); *Inter American*

Gilbert Walusinski,<sup>34</sup> president of the *Association des Professeurs de Mathématiques de l'Enseignement Public* (APMEP) from 1955 to 1958, and very involved in curriculum innovation and in teacher training in France.

Other presidents were passionate university teachers and lent their enthusiasm and experience in support of educational projects for school and teacher associations. This is the case of the British Michael James Lighthill<sup>35</sup> (1971-1974), applied mathematician, who was involved in an advisory capacity in the creation of the School Mathematics Project (SMP) in 1961, aimed at secondary school students 11 years and older. In 1970 he was elected president of the British Mathematical Association. Lighthill's contributions to mathematics education were mainly made in the 1960s and 1970s. He served on several important committees in England. In addition to being president of ICMI at the time of the second International Congress on Mathematics Education (Exeter, England, 1972), he was also chairman of its Organizing Committee. During his term of office a new policy of holding Regional Symposia "to facilitate wider discussion of mathematical education outside those areas of Europe and America where international meetings on the subject have mainly been held hitherto"<sup>36</sup> was adopted, and numerous symposia were held with the co-sponsorship of the ICMI<sup>37</sup>. One example is the symposium held jointly with UNESCO, in Nairobi, Kenya (1-11 September 1974) on "Interactions between linguistics and mathematical education", which was of particularly interest for African countries. He also had the opportunity to collaborate with a secretary who was an exceptional teacher and a fine author of works aimed at popularizing mathematics, the British Edwin Maxwell.<sup>38</sup> Maxwell was an active supporter of the SMP, for which he wrote the book *Geometry by transformations* (1975); he too was president of the Mathematical Association (1960) and was editor of the *Mathematical Gazette* (1963-1971). His book *Fallacies in mathematics* (1959) is quite well known.

The Japanese Shokichi Iyanaga,<sup>39</sup> president in 1975-1978, wrote many mathematical textbooks in Japanese for primary and secondary schools, even before his presidency. During those same years the ICMI secretary was the Japanese Yuki Yoshi Kawada,<sup>40</sup> who initiated the Southeast Asia Conference on Mathematical Education (SEACME) series in 1978 with the inaugural conference in Manila. This conference was very important for the involvement of the Eastern countries in the international movement of math education (see Lim-Teo, Suat Khoh, 2008).

Hassler Whitney<sup>41</sup> (1979-1982) had developed an interest in mathematics education, which occupied the last two decades of his life, even before his official retirement in 1977. His main interest was primary education. As Kilpatrick underlines in his cameo, Whitney was opposed to formal instruction in arithmetic in the early grades, and he criticized the habit of mathematics teachers of focusing on passing tests rather than what he called "meaningful goals." He was particularly disturbed by national reports that called for more

---

*Conference on Mathematical Education*. (4-9 December 1961) in Bogotá (Colombia). See (Giacardi, 2008, *Timeline* 1960-1966).

<sup>34</sup>See Eric Barbazo's cameo in (Furinghetti, Giacardi, 2008).

<sup>35</sup>See Adrian Rice's cameo in (Furinghetti, Giacardi, 2008).

<sup>36</sup>*EM*, 1975, s. 2, 21, 330.

<sup>37</sup>*EM*, 1973, s. 2, 19, 171, and (Giacardi, 2008, *Timeline* 1972-1976).

<sup>38</sup>See Adrian Rice's cameo in (Furinghetti, Giacardi, 2008).

<sup>39</sup>See Shigeru Iitaka's cameo in (Furinghetti, Giacardi, 2008).

<sup>40</sup>See Shigeru Iitaka's cameo in (Furinghetti, Giacardi, 2008).

<sup>41</sup>See Jeremy Kilpatrick's cameo in (Furinghetti, Giacardi, 2008).

mathematics to be taught earlier in school:

The most pressing need I see is for us to face fully the consequences of interventions we make, and hold up on those with bad results. I speak, of course, of mandating more work in mathematics for failing students, raising standards for these without helping them toward meeting the standards, and starting mathematics teaching at an earlier age. It is unthinkable to market drugs without a thorough study of all effects; in education I see no parallel concern, though there should be (Whitney, 1985, p. 233).

The commitment to education of Miguel de Guzmán<sup>42</sup> (1991-1998), who presided over ICMI for two mandates, began very early and permeated his work. Convinced that “teaching in any form is very attractive” but also that the “nature of the mathematical task makes it capable of stimulating important ethical aspects”, he worked to involve other mathematicians in mathematics education problems, while he himself contributed to mathematics education writing several “popular” books on mathematics. According to de Guzmán, mathematics teaching should pay particular attention to problem solving, with an emphasis on the thought processes, to the exploration of applications, games, etc., to the impact of calculators and computers, and to the history of mathematics. One of his major contributions to ICMI was the Solidarity Program, aimed at supporting the improvement of mathematics education in developing countries.

It is worth noting that some of the presidents and secretaries we have mentioned were involved in the activity of national associations of teachers (notably Behnke, Lichnérowicz, Lighthill, Maxwell and Walusinski). Some were active in the discussion for curriculum innovation in their countries (notably Behnke, Lichnérowicz, Maxwell, Smith and Stone). Some presidents and secretaries brought into ICMI the ideas and ferments developed in other environments: this is true, in particular, of Freudenthal and Lichnérowicz, who were among the founders of CIEAEM, the commission that contributed to the creation of new approaches to problems of mathematics education (see Furinghetti et al., 2008).

Particularly worthy of note are two presidents whose activities in ICMI played a significant role in changing the status and policy of the Commission: Behnke (1955-1958) and Freudenthal (1967-1970). Both relegated their ICMI secretaries to a marginal role. Under Behnke the secretary was the French Julien Desforges,<sup>43</sup> who was quite involved in mathematics education, first as president of APMEP in 1931-1932 and 1934-1937, and then as a member of *Conseil supérieur de l’instruction publique*, to which he was elected in 1936. Under Freudenthal the secretary was the Swiss André Delessert. As the president of IMU Henri Cartan complained in a letter to Lighthill dated August 20, 1970 (IA, 14B 1967-1974), he was reduced to a “mailbox”.

Behnke and Freudenthal were active during crucial moments in the history of ICMI: the former during the reconstruction that followed WW2, the latter during the period of major social changes that also affected the school and academic worlds. The key issues in their work were the relationship with the community of mathematicians and the search for

---

<sup>42</sup>See Jaime Carvalho e Silva’s cameo in (Furinghetti, Giacardi, 2008).

<sup>43</sup>See Eric Barbazo’s cameo in (Furinghetti, Giacardi, 2008).

autonomy from it.<sup>44</sup> Behnke was the first secretary of the renewed Commission after WW2, then president of the ICMI from 1955 to 1958, vice-president from 1959 to 1962, and a member of the Executive Committee from 1963 to 1970. The beginnings of the new Commission were not easy, and relations with the IMU were characterized by constant friction<sup>45</sup> derived from the lack of precise Terms of Reference for governing the activities of the Commission. As ICMI secretary under Chat  let, Behnke was very active and succeeded, in spite of several difficulties, in organizing the intervention of ICMI at the International Congress of Mathematicians in Amsterdam in 1954. The General Assembly of the IMU in The Hague (31 August - 1 September 1954) introduced the Terms of Reference for governing the activities of the Commission and the relationships with IMU: according to these, ICMI had a relatively free hand in its internal organization, but IMU retained control over important points: the President and the ten members-at-large of ICMI would be elected by the General Assembly of IMU based on nominations by the Union's president. Moreover, the national delegates would be named by each National Adhering Organization of IMU. The Executive Committee of ICMI was renewed, with Behnke nominated president. As his correspondence kept in the ICMI Archives shows, he was completely aware of the problems he had to face in revitalizing the Commission: the difficulty of finding mathematicians active in research who were interested in teaching; the difficulty of being recognized in the world of mathematical research, and thus how important it was that the work of the Commission be visible at the international congresses; the difficulty of obtaining funding; the need to improve relations with IMU, and finally, the relevance of the collaboration of mathematics teachers at all levels.<sup>46</sup>

Freudenthal (1967-1970) continued this work in an even more radical way. He sought and obtained funding beyond that provided by the IMU, carried on the collaboration with UNESCO, already well established by his predecessors, and undertook the two initiatives that were mentioned in section 2: in May 1968 the first issue of the new journal *Educational Studies in Mathematics* appeared, and in August 1969 the First International Congress on Mathematical Education was held in Lyon, France. The IMU was faced with decisions already made. Freudenthal grasped the spirit of the times and the new needs of society, and suggested new topics for discussion that included motivation, comparative evaluation of the contents of mathematics courses, criteria of success, research methodology, evaluation of the results of research in mathematics education, international cooperation, the permanent training of teachers, and the place of "the theory of mathematical education" in universities or research institutes.<sup>47</sup> He also fostered the recognition of mathematics education as a separate academic discipline.

The change promoted by Freudenthal was radical, and after his mandate things were no longer the same: on the one hand, mathematics education was becoming an autonomous discipline with its own congresses and journals; on the other, ICMI was performing a

---

<sup>44</sup>See (Arzarello et al, to appear; Furinghetti, 2008a). The action of these two presidents in relation with the community of mathematicians is analysed with reference to the documents kept in ICMI archives in (Furinghetti, Giacardi, 2010).

<sup>45</sup>See for example Stone to Ch  telet, Chicago, November 3, 1952, in *IA*, 14A, 1952-1954; Hodge to Stone, May 31, 1954, *IMU Archives*, quoted in (Lehto, 1998, p. 111); Stone to Ch  telet, Chicago, July 29, 1954, and Behnke to Stone, Oberwolfach, August 11, 1954, in *IA*, 14A, 1952-1954; see (Giacardi, 2008, *Timeline*, 1937-1954).

<sup>46</sup>*Report of the president of the International Commission of Mathematical Instruction to the president of the International Mathematical Union*, April 20, 1955, in *IA*, 14A, 1955-1957.

<sup>47</sup>See *EM*, 1967, s. 2, 13, 245-246, and (Giacardi 2008, *Timeline* 1967-1971).

more institutional role, building on what he had begun and extending his influence beyond Europe and the US. Papers specifically dealing with education were appearing in the new journals founded from 1968 on. The research in mathematics education was strengthened by the creation in 1976 of the first affiliated Study Groups, those of History and Pedagogy of Mathematics (HPM) and Psychology of Mathematics Education (PME). Their founding was fostered by the opportunities to compare and contrast different points of view provided by ICMEs. ICME conferences made it possible to realize the concept of internationalization in new, more efficient ways.

Let us conclude by briefly mentioning the role of women in ICMI. The first woman included in the Executive Committee was the Canadian Anna Sierpinska, appointed a member-at-large in 1994. Up to 2008, of the 107 officers, only nine are women. At ICM-2006 the French Michèle Artigue became the first woman appointed as president of ICMI. In the trend to include women ICMI was more advanced than its parent body IMU. It was only during the ICM-2002 in Beijing, China, that a woman was first appointed as a members of IMU Executive Committee: the Norwegian Ragni Piene (the daughter of the ICMI officer Kay Waldemar Kielland Piene) (see Li, 2002).

However, even though they were not part of the Central/Executive Committee, several other women also contributed to the development of ICMI and to the discipline of mathematics education in different ways. This is not surprising because since the beginning of the twentieth century women joined the profession of teaching, and some of them delved quite deeply into various aspects of mathematics education (see Furinghetti, 2008b). As early as 1928, a secondary teacher, Maria Giovanna Sittignani, presented a paper specifically addressing didactics in the section devoted to mathematics teaching at the 1928 International Congress of Mathematicians held in Bologna. It is also worth noting that Freudenthal included in the editorial board of *Educational Studies in Mathematics* three women who played remarkable roles in the development of mathematics education after WW2: Emma Castelnuovo, Anna Zofia Krigowska and Lucienne Félix. Papers by Castelnuovo, Krygowska, Galina G. Maslova, and Frédérique Papy are included in the proceedings of the first ICME. The number of women participating as researchers or teachers in ICMI activities continued to grow with the passing of time.

We would also like to mention some of the women who worked behind the scenes, but who nevertheless played an important role. A first interesting female presence is that of Tatiana Ehrenfest-Afanassjewa, a Ukrainian mathematician who, after moving to Leiden, became a leading figure in the development of mathematics education in the Netherlands. As a chair of a discussion group she invited Freudenthal, who had not yet published didactical papers, to deliver a talk as a mathematician. Freudenthal later became a regular participant of the group, and in 1950 he became its chairman. As Smid (2009, p. 218) notes “There can be no doubt that the monthly meetings of this group helped him to form, shape and develop his, at that time still vague, ideas on math teaching” (see also la Bastide-van Gemert, 2006, pp. 126-138).

It must be acknowledged that the large amount of business conducted by Behnke and Freudenthal during their presidencies was made possible by the exceptional involvement of their personal secretaries. Behnke’s secretary, Renate Wohler, was fluent in several

languages; she not only translated his letters into English and French, but sometimes responded in his stead and accompanied him on his trips abroad.<sup>48</sup> Freudenthal's secretary, D. Breughel-Vollgraff, assisted him with his work on a daily basis, thus making it possible for him to dedicate himself completely to scientific research and related activities. During his presidency she also fulfilled a large part of the duties of the secretary of ICMI,<sup>49</sup> and Freudenthal acknowledged this fact on many occasions. In the introduction to his book *Didactical phenomenology of mathematical structures* (1983, Dordrecht / Boston / Lancaster: D. Reidel), we read: "Let me add that my secretary and collaborator for almost 25 years, Mrs. Breughel read and wrote the last line of the illegible Dutch manuscript of this book the day before she retired" (p. ix). The following passage in a letter to Howson epitomizes Freudenthal's appreciation of this woman:

If you wonder how anybody could travel, lecture, edit, publish so much at a time, my explanation is that for 25 years I had a secretary, Mrs. Breughel, who was unsurpassable. If I die early enough to get an obituary, her name should not be forgotten.<sup>50</sup>

## REFERENCES

### *Archival sources*

- IMU Archives at the central Archives of the University of Helsinki, Folders 14 A and 14 B.

### *Printed sources*

- Arzarello, F., Giacardi, L., Furinghetti, F., Menghini, M., to appear, "Celebrating the first century of ICMI (1908-2008). Some aspects of the history of ICMI", in *Proceedings of ICME-11*.
- Bass, H., Hodgson, B. R., 2004, "The International Commission on Mathematical Instruction. What? Why? For whom?", *Notices of the AMS* **51**, 639-644.
- Bastide-van Gemert, S. la, 2006, *Elke positieve actie begint met kritiek. Hans Freudenthal en de didactiek van de wiskunde*, Hilversum: Verloren.
- Bjarnadóttir, K., Furinghetti, F., Schubring, G. (eds.), 2009, "Dig where you stand". *Proceedings of the Conference on On-going Research in the History of Mathematics Education*, Reykjavik: University of Iceland – School of Education.
- Charlot, B., 1984, "Le virage des mathématiques modernes - Histoire d'une réforme: idées directrices et contraintes", *Bulletin APMEP* **352**, 15-31.
- Condette, J.-F., 2009, *Albert Châtelet: la République par l'École*, Arras: Artois Presses Université.
- Corry, L., 2007, "Axiomatics between Hilbert and the New Math: Diverging views on mathematical research and their consequences on education", *International Journal for the History of Mathematics Education* **2**(2), 21-37.
- Fehr, H., 1920-1921, "La Commission internationale de l'enseignement mathématique de 1908 à 1920. Compte rendu sommaire suivi de la liste complète des travaux publiés par la Commission et les Sous-commissions nationales", *L'Enseignement Mathématique* **21**, 305-342.
- Furinghetti, F., 2003, "Mathematical instruction in an international perspective: the contribution of the journal *L'Enseignement mathématique*", in *One hundred years of L'Enseignement Mathématique*, D. Coray, F. Furinghetti, H. Gispert, B. R. Hodgson, G. Schubring (eds.), *L'Enseignement Mathématique Monographie* **39**, 19-46.
- Furinghetti, F., 2008a, "Mathematics education in the ICMI perspective", *International Journal for the History of Mathematics Education* **3**(2), 47-56.
- Furinghetti, F., 2008b, "The emergence of women on the international stage of mathematics education", *ZDM* **40**, 529-543.

<sup>48</sup>See, for example, Behnke (signed by R. Wolhert) to E. Bompiani, 15 August 1955; R. Wohlert to E. Bompiani, 24 September 1955, in IA 1955-1957; see also all the letters with the initials Be/Wo in the list in (Giacardi, 2009, *Documents, ICMI Archives*).

<sup>49</sup>See A. Delessert to O. Frostmann, 22 March 1959, IA 1967-1980.

<sup>50</sup>Freudenthal to Howson, 19 July 1983; RANH, Hans Freudenthal Papers, inv. nr. 38, in (Bastide-van Gemert, 2006, p. 63), We thank Jan van Maanen for this information.

- Furinghetti, F., 2009, “The evolution of the journal *L’Enseignement Mathématique* from its initial aims to new trends”, in “*Dig where you stand*”. *Proceedings of the Conference on On-going Research in the History of Mathematics Education*, K. Bjarnadóttir, F. Furinghetti, G. Schubring (eds.), Reykjavik: University of Iceland – School of Education, pp. 31-46.
- Furinghetti, F., Giacardi, L., 2008, *The first century of the International Commission on Mathematical Instruction (1908-2008). The history of ICMI*, <http://www.icmihistory.unito.it/>.
- Furinghetti, F., Giacardi, L., 2010, “People, events, and documents of ICMI’s first century”, *Actes d’Història de la Ciència i de la Tècnica nova època* **3**(2), 11-50.
- Furinghetti, F., Menghini, M., Giacardi, L., Arzarello, F., 2008, “ICMI Renaissance: the emergence of new issues in mathematics education”, in *The first century of the International Commission on Mathematical Instruction (1908-2008). Reflecting and shaping the world of mathematics education*, M. Menghini, F. Furinghetti, L. Giacardi, F. Arzarello (eds.), Rome: Istituto della Enciclopedia Italiana, pp. 131-147.
- Giacardi, L., 2008, *Timeline*, in (Furinghetti, Giacardi, 2008).
- Giacardi, L., 2009, *Documents*, in (Furinghetti, Giacardi, 2008).
- Hodgson, B. R., 2009, “ICMI in the post-Freudenthal era: moments in the history of mathematics education from an international perspective”, in “*Dig where you stand*”. *Proceedings of the Conference on On-going Research in the History of Mathematics Education*, K. Bjarnadóttir, F. Furinghetti, G. Schubring (eds.), Reykjavik: University of Iceland – School of Education, pp. 79-96.
- Howson, A. G., 1984, “Seventy-five years of the International Commission on Mathematical Instruction”, *Educational Studies in Mathematics* **15**, 75-93.
- Lehto, O., 1998, *Mathematics without Borders: A History of the International Mathematical Union*, New York: Springer Verlag.
- Lim-Teo, Suat Khoh, 2008, ICMI activities in East and Southeast Asia: Thirty years of academic discourse and deliberations, in M. Menghini et al. (2008), pp. 247-252.
- Li, T. (ed.), 2002, *Proceedings of the International Congress of Mathematicians*, Beijing: Higher Education Press.
- Menghini, M., Furinghetti, F., Giacardi, L., Arzarello, F. (eds.), 2008, *The First Century of the International Commission on Mathematical Instruction (1908-2008). Reflecting and Shaping the World of Mathematics Education*. Rome: Istituto della Enciclopedia Italiana.
- Schubring, G., 2003, “*L’Enseignement Mathématique* and the first International Commission (IMUK): The emergence of international communication and cooperation”, in *One hundred years of L’Enseignement Mathématique*, D. Coray, F. Furinghetti, H. Gispert, B. R. Hodgson, G. Schubring (eds.), *L’Enseignement Mathématique Monographie* **39**, 49-68.
- Schubring, G., 2008, “The origins and early history of ICMI”, *International Journal for the History of Mathematics Education* **3**(2), 3-33. A shorter version is in (Menghini, Furinghetti, Giacardi, Arzarello, 2008) pp. 113-130.
- Smid, H., 2009, “Foreign influences on Dutch mathematics teaching”, in “*Dig where you stand*”. *Proceedings of the Conference on On-going Research in the History of Mathematics Education*, K. Bjarnadóttir, F. Furinghetti, G. Schubring (eds.), Reykjavik: University of Iceland – School of Education, pp. 209-222.
- Smith D. E., 1905, “Opinion de David-Eugene Smith sur les réformes à accomplir dans l’enseignement des mathématiques”, *L’Enseignement Mathématique* **7**, 469-471.
- Walmsley, A. L. E., 2003, *A history of the “new mathematics” movement and its relationship with current mathematical reform*, Lanham, MA: University Press of America.
- Whitney, H., 1985, “Taking responsibility in school mathematics education”, *Journal of Mathematical Behavior* **4**, 219-235.

