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PEOPLE, EVENTS, AND DOCUMENTS OF ICMI'S FIRST CENTURY

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Summary: *On the occasion of the ICMI centenary, the authors of the present paper 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. This website provides an effective instrument for revisiting the history of ICMI and for reflecting on some key moments. In particular, it makes it possible to identify how the key ideas (internationalization, communication, solidarity) that inspired the founding of ICMI were realized, as well as the how the relationship with the community of mathematicians changed.*

In the present paper we walk through the Portrait gallery section of the website, focusing on the presidents of ICMI and their contributions to the evolution of both the Commission's policies and its methodological approaches to problems, looking at the history of ICMI from the perspective of the people who built it. Moreover, we present some statistical data concerning the life of ICMI (people, countries, meetings, etc.) and also offer flashes of lesser-known aspects that came to light after a reading of the documents housed in ICMI Archives in Helsinki.

Key words: *History of ICMI, mathematics education, mathematicians*

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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. Though this commission underwent various changes, it may be acknowledged as the first incarnation of the present International Commission on Mathematical Instruction (ICMI).[1] Its mission and scope are outlined in (Bass & Hodgson, 2004); the book (Menghini *et al*., 2008), resulting from the Rome Symposium organized to celebrate the ICMI centenary, illustrates various lines of its development from the social, political, and scientific points of view. ICMI website provides more detailed information on its organization and the wide range of activities carried out all around the world. In this paper we present some aspects of ICMI's course in its first hundred years, with particular reference to the role of some of its presidents.

A corpus of works regarding the history of ICMI already exists. 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 by Furinghetti (2003) and Schubring (2003). Donaghue (2008) and Schubring (2008) document the inception and early history of ICMI. Furinghetti *et al*. (2008) identify the conditions underlying the ICMI's renaissance after World War II. The emerging of mathematics education as an academic discipline is outlined in (Bass, 2008), (Furinghetti, 2008a), (Hodgson, 2009), and (Kilpatrick, 2008). Giacardi (2009b) presents the history of the Italian sub-commission of ICMI up to the 1950s. The website[2] designed on the occasion of ICMI's centenary provides detailed information on people and events. It contains data and ample documentation that make it possible to go deeper into the history of ICMI and learn more about the protagonists, events, and official and non-official publications. It is divided into the following sections: *Timeline; Portrait Gallery; Documents; The Affiliated Study Groups; The International Congresses on Mathematical Education; Interviews and*

1. Though in this paper we use the acronym ICMI for all periods, it should be noted that the name of the Commission underwent many changes. 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). In English we find slightly different expressions and no acronyms; for example Smith (1913) used the expression "International Commission on the Teaching of Mathematics." When the International Mathematics Union had reconstituted the Commission (March 6-8, 1952) the name International Mathematical Instruction Commission (IMIC) was adopted (*L'Enseignement Mathématique,* 1951-1954, 40: 81). This denomination was ephemeral: in the closing speech of the twelfth International Congress of Mathematicians held in 1954, A. Schouten thanked the organizations that supported the congress, among them "the C.I.E.M., I.C.M.I., or I.M.U.K" (Gerretsen & de Groot, 1957: 156). As the English language became the international language in the mathematics community, ICMI became the denomination most frequently used.

2. In what follows we refer to the website as (Furinghetti & Giacardi, 2008). A more detailed description of the website in (Furinghetti & Giacardi, to appear).

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Film Clips. In this paper we will mainly refer to the sections *Timeline, Portrait Gallery*, and *Documents*. The *Timeline* illustrates the most important moments in the history of ICMI (people, congresses, interactions with other entities, etc.) up to 1976. 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 (Giacardi 2008). The *Portrait Gallery* contains the cameos 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 ICMI history. The authors of the cameos are historians and mathematicians from around the world. 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. The *Documents* section 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 (from now on *IA*).[3]

A leading thread in the history of ICMI is the relationship with mathematicians. Many facts evidence the close intertwining of the lives of the two communities. Firstly, the idea of organizing an International Congress of Mathematicians, which afterwards became a regular event held every four years, was launched in the first issue of the journal *L'Intermédiaire des Mathématiciens* (1894, 1, question 212: 113) directed by Émile Lemoine and Charles-Ange Laisant. Laisant, together with Henri Fehr, was the founder and editor of *L'Enseignement Mathématique*, the journal that published a paper by Smith (1905) which advocated more international cooperation and the creation of a commission to be appointed during an international conference to study instructional problems in different countries. This project was warmly received by the community of mathematicians and, as mentioned earlier, in 1908, during the fourth International Congress of Mathematicians, held in Rome from April 6 to 11, 1908, a Commission on the Teaching of Mathematics, was founded. For a long time the main activities of the Commission took place during the International Congresses of Mathematicians (see Furinghetti, 2007; Giacardi, 2008). The mandates for future activities were established each four years during the International Congresses of Mathematicians, and from 1952 on the members of the Executive Committee were appointed by the community of mathematicians during the General Assembly of IMU on the occasion of the International Mathematical Congresses. In what follows we will see that this fact affected the course of ICMI.

3. 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. We shall refer to them here as *IA* for "ICMI Archives."

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From the beginning, the journal *L'Enseignement Mathématique* was the official organ of the Commission. The directors of the journal and the editorial board – when it existed – were mainly composed of mathematicians. The first exception was the historian and mathematics educator David Eugene Smith, who taught at Teachers College of New York, a teacher training school. After WW2 the journal gradually became a mathematical journal and the successive editorial boards were composed of mathematicians, with the exceptions of Jean Piaget and Ferdinand Gonseth. As for ICMI, its first president was an outstanding mathematician, Felix Klein, who was ideally suited for this position both because of his prestigious contributions to mathematical research and for his actions in dealing with instructional problems in his country. After him, until 2006, no presidents, except Smith, were mathematics educators. Some, however, showed a remarkable interest in instructional problems and made significant contributions to ICMI activities.

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. This represents a major turning point in the course of ICMI, because it marks the attainment of ICMI's autonomy with respect to the community of mathematicians.

In the present paper we provide elements that contributed to the path leading to the status consequent to the Terms of References of 2007 and identify people who most contributed to this achievement. First we will outline some general features of ICMI's history and its organization during the first hundred years. Afterwards we bring to the fore some aspects of the relationship between the two communities of mathematicians and mathematics educators. Our focus will be on Heinrich Behnke and Hans Freudenthal, two key figures in the period from the (re)birth of ICMI after WW2 until the first International Congress on Mathematical Education (ICME). Some events of those years made the relationship more problematical than in the past: the world was changing and ICMI, which by its nature and scope necessarily has strong links with society, had to face the challenge of adapting its actions to meet these changes and the emerging needs of society. The academic world of mathematics was changing too, and new trends of research were emerging. This implied an overall rethinking of ICMI's policies; in particular, it was necessary to attain freedom of action in order to co-opt people expert in the field of education and act with efficiency in the school environment. Behnke and Freudenthal played a significant role in this direction and laid the foundations for the new trends in approaching the problems of mathematics education.

2. Five periods in ICMI's life

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.

TABLEAU D'ENSEMBLE DE LA RÉPARTITION PAR PAYS

	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: 339).

1. Foundation and early period up to WW1 (President: Felix Klein)

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 contains the impressive list, shown in Figure 1, 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.[4]

4. See *Questionnaires and reports* in (Furinghetti & Giacardi, 2008).

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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 ICMI after WW1, underlining the role of the secretary[5] 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 "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*" (see http://www.mathunion.org). During the first General Assembly held in Rome in 1952 the ICMI 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[6] were adopted during the second General Assembly of IMU (The Hague, August 31 – September 1, 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, now OECD) 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 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 (SMSG) was created under the directorship of Edward

5. The term "secretary general" was used in the first few decades of the ICMI, and became "secretary" after 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.

6. 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/.

G. Begle,[7] 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 the ICMI Executive Committee (Evert W. Beth,[8] 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 both the circulation of ideas at an international level and 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 Fréderique Papy appeared in 1963. This ferment led to a rapid increase in the number of mathematics educators and provided a significant impulse to activities that would develop further during the next period.

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 other 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

7. See Jeremy Kilpatrick's cameo in (Furinghetti & Giacardi, 2008).

8. See Giorgio T. Bagni's cameo in (Furinghetti & Giacardi, 2008).

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 IREMs (*Instituts de Recherche sur l'Enseignement des Mathématiques*) were established in Lyon, Paris, and Strasbourg. In 1967 the Nordic 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 the 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).[9] 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 educators has taken place. Many activities such as conferences and working sessions were organized, and publications were edited by the Affiliated Study Groups of ICMI.[10] In 1984 the ICMI Studies[11] were launched under the presidency of Kahane, with Geoffrey Howson as 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

9. For the history of these Study Groups, see the section *The Affiliated Study Groups* in (Furinghetti & Giacardi, 2008).

10. 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), and in 2003 ICTMA (International Community of Teachers of Modelling and Applications).

11. See the section *The ICMI Studies and Study Volumes: The past Studies - Studies in progress* in (Furinghetti & Giacardi, 2008).

from IMU. As mentioned above, according to the Terms of Reference of 2007, the Executive Committee of ICMI is elected by the General Assembly of ICMI itself.[12]

3. Aspects of internationalization, communication, and solidarity in the life of ICMI

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,[13] Norway, Portugal, Romania, Russia, Sweden, Switzerland, the British Isles, and USA (19 countries).[14] Each country had either one or three delegates.[15] 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. By 1955, of the 29 countries which were part of IMU[16] only 15 had designated their two delegates (6 others would soon follow).[17] 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; conferences and other activities were organized outside Europe. In the meeting of

12. See http://www.mathunion.org/icmi/about-icmi/icmi-as-an-organisation/terms-of-reference/

13. 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.

14. 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.

15. See (Giacardi, 2008; *EM*, 1908, 10, 445-458; *EM*, 1909, 11, 193-204).

16. The member nations of IMU are listed in the Appendix 1 of (Lehto, 1998).

17. See (Giacardi, 2008; *EM*, 1955, s. 2, 1, 195-198, *EM*, 1955, s. 2, 1, 202).

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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)			

ICMI in Paris (February 14-15, 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.[18] 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[19] there are 85 member countries of ICMI, 68 of which are also members of 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).

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

18. See (Giacardi, 2008; *EM*, 1966, s. 2, 12, 134).

19. See *ICMI members* in http://www.mathunion.org/icmi/about-icmi/members/.

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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[20] coming from 33 countries,[21] 24 of which are European, as can be seen in Table 2. Before WW2 only Europe, USA, and Cana-

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 (1)	Sweden (2)
Brazil (2)	Hungary (2)	Philippines (1)	Switzerland (6)
Bulgaria (1)	India (2)	Poland (2)	United Kingdom (8)
Canada (4)	Italy (4)	Portugal (1)	United States of America (14)
China and Hong Kong (3)	Japan (5)	Russia (4)	USSR (4)
Colombia (2)	Mexico (1)	Singapore (1)	Yugoslavia (1)
Denmark (3)			

da had officers. In 1955 an officer from Asia was appointed (the Indian Ram Behari); 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.

20. Some officers served for more than one mandate.

21. The country attributed to the officers is that where they were mainly working when serving as ICMI officers.

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

Years	Presidents	Country	Secretary	Country
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).

While the evolution towards "geographical equity" has been slow, the evolution towards "gender equity" has been even slower. The first woman included in the Executive Committee was Anna Sierpinska (Canada), 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. Even so, 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 member of IMU Executive Committee. She was the Norwegian Ragni Piene, the daughter of the ICMI officer (1955-1958) 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 taking part in ICMI activities as researchers in didactics or as teachers 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 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: 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: 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 Wohlert, 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.[22] 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

22. See, for example, Behnke (signed by R. Wolhert) to E. Bompiani, 15 August 1955; R. Wohlert to E. Bompiani, 24 September 1955, in *IA,* 14 A, 1955-1957; see also all the letters with the initials Be/Wo in the list in (Giacardi, 2009, *Documents*, *ICMI Archives*).

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presidency she also fulfilled a large part of the duties of the secretary of ICMI,[23] 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. [24]

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

23. See A. Delessert to O. Frostmann, March 22, 1969, *IA*, 14 B, 1967-1980.

24. Freudenthal to Howson, July 19, 1983; RANH, Hans Freudenthal Papers, inv. nr. 38, in (Bastide-van Gemert, 2006: 63), We thank Jan van Maanen for this information.

at the founding of ICMI in Rome are rather obvious. Felix Klein[25] 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.[26] Henri Fehr[27] 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 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.[28]

25. See Gert Schubring's cameo in (Furinghetti & Giacardi, 2008).

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

27. See Gert Schubring's cameo in (Furinghetti & Giacardi, 2008).

28. See Gert Schubring's cameo in (Furinghetti & Giacardi, 2008).

Jacques Hadamard,[29] 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[30] (1952-1954) contributed to the development of the French university in the twentieth century by promoting trends of research and covering administrative roles, such as dean of Faculté des sciences of Lille, rector de l'*Académie de Lille*, and dean of Faculté des sciences of Paris. His interest in social issues encompassed a commitment to activities addressed to young people, military service during the war, and engagement in French politics after WW2 (see Condette, 2009). Appointed as a *Directeur de l'Enseignement du second degré* in 1936, until 1940 he worked for the modernization of the educational system in France. In education his interest in topics such as the laboratories of mathematics and the use of concrete materials is remarkable. He directed collections of manuals for primary and secondary teaching and authored many publications in the field of education, among them the well known book on introducing children to arithmetic written in collaboration with Jean Piaget.[31] He wrote the ICMI report on the development of mathematics teaching in France since 1910.[32] Moreover he was actively involved in French politics. Considering Châtelet's involvement in such a number of important activities it is not surprising that during his mandate the Commission's activities were largely overseen by the secretary Behnke.[33] Condette writes that when in 1953 he decided to retire he was *usé par la lourdeur de ces tâches de direction*, "worn out by that weight of the task of management," (2009: 247).

Marshall Harvey Stone[34] 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 (November 23 - De-

29. See Hélène Gispert's cameo in (Furinghetti & Giacardi, 2008).

30. See the cameo by Sébastien Gauthier and Catherine Goldstein to appear in (Furinghetti & Giacardi, 2008).

31. See Piaget, J., Boscher, B., Châtelet, A., 1949, *Initiation au calcul. Enfants de 4 a 7 ans*, Paris: Bourrelier.

32. Châtelet, A. (1929). Les modifications essentielles de l'enseignement mathématique dans les principaux pays depuis 1910. France. *L'Enseignement Mathématique, 28*, 6-12.

33. 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 Jean-François Condette. We thank Condette and Jean-Yves Séguy for the information about Châtelet.

34. See Jeremy Kilpatrick's cameo in (Furinghetti & Giacardi, 2008).

cember 4, 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.[35] During his mandate ICMI co-sponsored important international meetings[36] with the collaboration of OEEC and UNESCO. He was flanked by secretary Gilbert Walusinski,[37] 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[38] (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"[39] was adopted, and numerous symposia were held with the co-sponsorship of the ICMI.[40] One example is the symposium held jointly with UNESCO, in Nairobi, Kenya (September 1-11, 1974) on "Interactions between linguistics and mathematical education," which was of particular interest for African countries. He also had the oppor-

35. See *New Thinking in School Mathematics*, OEEC, 1961: 28-29.

36. We mention for example: *Symposium on the teaching of Geometry in Secondary School* (May 30 – June 2, 1960) in Aarhus (Denmark); *Symposium on the Co-ordination of the Teaching of Mathematics and Physics* (September 19-24, 1960) in Belgrade (Yugoslavia); *Seminar on the teaching of analysis and relative manuals* (June 26-29, 1961) in Lausanne (Switzerland); *Seminar on a discussion of the Aarhus and Dubrovnik reports on the teaching of geometry at the secondary level* (October 4-8, 1961) in Bologna (Italy); *Inter American Conference on Mathematical Education* (December 4-9, 1961) in Bogotá (Colombia). See (Giacardi, 2008, *Timeline* 1960-1966).

37. See Eric Barbazo's cameo in (Furinghetti & Giacardi, 2008).

38. See Adrian Rice's cameo in (Furinghetti & Giacardi, 2008).

39. *EM*, 1975, s. 2, 21: 330.

40. *EM*, 1973, s. 2, 19: 171, and (Giacardi, 2008, *Timeline* 1972-1976).

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tunity to collaborate with a secretary who was an exceptional teacher and a fine author of works aimed at popularizing mathematics, the British Edwin Maxwell.[41] 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,[42] president in 1975-1978, in addition to his important work in mathematical research, 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 Yukiyoshi Kawada,[43] who initiated the Southeast Asia Conference on Mathematical Education (SEACME) series in 1978 with the inaugural conference in Manila. This conference is very important for the involvement of the Eastern countries in the international movement of math education (see Lim-Teo, Suat Khoh, 2008).

Hassler Whitney[44] (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 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: 233).

The commitment to education of Miguel de Guzmán[45] (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 mathemati-

41. See Adrian Rice's cameo in (Furinghetti & Giacardi, 2008).
42. See Shigeru Iitaka's cameo in (Furinghetti & Giacardi, 2008).
43. See Shigeru Iitaka's cameo in (Furinghetti & Giacardi, 2008).
44. See Jeremy Kilpatrick's cameo in (Furinghetti & Giacardi, 2008).
45. See Jaime Carvalho e Silva's cameo in (Furinghetti & Giacardi, 2008).

cians 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 discussions about 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).

5. Two special presidents in two key moments

Particularly worthy of note are two presidents whose initiatives in ICMI played a significant role in changing the status and policy of the Commission: Heinrich Behnke (1955-1958) and Hans Freudenthal (1967-1970). They 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. Both relegated their ICMI secretaries to a marginal role. Under Behnke the secretary was the French Julien Desforges,[46] who was quite involved in national 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), Delessert was reduced to a "mailbox."

The key issues in their work were the relationship with the community of mathematicians and the search for autonomy from it.[47] We have repeatedly mentioned how closely the life of ICMI was intertwined with the activities of the mathematical community even before the creation of IMU in 1920 in Strasbourg. In its first decades ICMI was always mandated only for the four-year periods between the International congresses of Mathematicians, and this mandate had always been reconfirmed until the International Congress of Mathematicians of 1936 held in Oslo. The Commission and the Central Committee in office were in-

46. See Eric Barbazo's cameo in (Furinghetti & Giacardi, 2008).

47. See (Arzarello *et al*, to appear; Furinghetti, 2008a).

vited to continue their activities until the next International Congress of Mathematicians, but at the first International Congress of Mathematicians after the stop due to WW2 (1950 in Cambridge, USA) the mandate of the Commission was not discussed.

In 1952, when ICMI became a permanent sub-commission of IMU, problems to solve emerged: the relationship between IMU and ICMI, the respective competences, financial issues, the formation of the national sub-commissions, etc. On one hand the mathematicians were aware of the importance of considering the problems of mathematical instruction, a concern expressed, for example, by the following passage of IMU president Stone:

> The problem of determining the place of mathematics cannot be divorced from technical considerations concerning teaching methods. If we judge by the results, we must find it difficult to escape from the conclusion that our attempts to teach mathematics as part of a program of mass education have so far been, to put it bluntly, a colossal failure, traceable to our ignorance and complacency in respect to the art of teaching.[48]

On the other hand, as illustrated by Arzarello *et al*. (to appear), Furinghetti (2008a), and Lehto (1998), there was friction between the two bodies; this is particularly evident during the presidencies of Behnke and Freudenthal. The role of Behnke in less well known, so it merits further discussion.

Behnke was the first secretary of the renewed Commission, then president of the ICMI from 1955 to 1958, vice-president from 1959 to 1962, and member of the Executive Committee from 1963 to 1970. His political action was significant, even though the beginnings of the new commission were not easy and relations with the IMU were characterized by constant friction, which derived from the lack of precise terms of reference for governing the activities of the Commission.

Evidence of the difficulties is found in passages from the correspondence in ICMI Archives. Stone, IMU president, wrote to Châtelet:

> It is my understanding that the Commission has proposed an arrangement whereby it will seek the adherence of several nations and set up special national committees in the adhering nations to work with the Commission. I believe that activity of this kind is inappropriate for a Commission of the Union and that it would lead to intolerable confusion as to the relations between the Union, the Commission, and the nations adhering to one or the other.[49]

48. M. Stone, "La prima assemblea generale della Unione Matematica Internazionale (Roma, 6-8 marzo 1952)," *La Ricerca scientifica*, 10, Ottobre 1952, 1974, also in *EM*, 1942-1950: 39 159.

49. Stone to Châtelet, Chicago, November 3, 1952, in *IA*, 14A, 1952-1954.

In a similar vein, William Hodge, member of the Executive Committee of IMU wrote to Stone:

> About ICMI, I agree very strongly that something must be done to curb its activities. I think it will be necessary to lay down very precise terms of reference for the Commission, and to define its powers very rigidly. It will also be necessary to select a president very carefully.[50]

And again Stone to Châtelet:

> ... each such Sub-Commission is to be in the first place a Sub-Committee of the National Committee for Mathematics in the Country which it represents.[51]

As mentioned earlier, in 1954 during the General Assembly of the IMU in The Hague the Terms of Reference were introduced. According to the new Terms of Reference ICMI had a relatively free hand in its internal organization, but IMU retained control on important points: the President and the ten members-at-large of ICMI would be elected by the General Assembly of IMU on the nomination of the Union's President. Moreover, the national delegates would be named by each National Adhering Organization of IMU. The Executive Committee of the ICMI was renewed; Behnke was nominated president. He was completely aware of the problems he had to face in revitalizing the Commission, as shown by his correspondence kept in the ICMI Archives; these included the difficulty of finding mathematicians active in research who were interested in teaching; the difficulty of being recognized in the world of mathematics, and thus how important it was that the work of the commission be visible at the International Congresses; the difficulty of obtaining funding; and, finally, the relevance of the collaboration of mathematics teachers at all levels. In a confidential letter to IMU president Marshall Stone, he wrote:

> It is a very difficult matter to engage mathematicians, well-known for their research work, into problems of instruction. Most of our colleagues refuse to be active for our commission because they regard this kind of work of little value, and they even neglect to forward circulars. [...] The work of our commission reveals its purpose and meaning only when we give lectures and exhibitions at the international mathematical congress.[52]

50. Hodge to Stone, May 31,1954, *IMU Archives*, quoted in (Lehto, 1998: 111).

51. Stone to Châtelet, Chicago, July 29, 1954, in *IA*, 14A, 1952-1954.

52. Behnke to Stone, Oberwolfach, August 11, 1954, in *IA*, 14A, 1952-1954.

He also underlined the need to improve the terms of reference for governing the activities of the Commission and the relationships with IMU; the importance of having regional groups in order to decrease the Eurocentricity in ICMI; and the need of holding ICMI congresses independent of the International Congresses of Mathematicians.[53]

Klein was Behnke's model. Like Klein, Behnke was a mathematician who invested great energy in teacher education. In his cameo Schubring recalls that he founded the *Semesterberichte zur Pflege des Zusammenhangs von Universität und Schule aus den mathematischen Seminaren*, a journal aimed at encouraging the connection between school and university, which he edited together with Otto Toeplitz, and that he promoted the establishment of the *Seminar für Didaktik der Mathematik*, the first institutionalization of mathematics education at a German university. Also like Klein, he dreamed of realizing an international encyclopaedia of elementary mathematics by means of a collaboration between university professors and secondary school teachers.[54] The Italian encyclopedia of elementary mathematics edited by Luigi Berzolari, Giulio Vivanti, and Duilio Gigli was "regarded as a model in certain ways."[55] In 1958 the German subcommittee of the ICMI produced the first of the five-volume *Grundzüge der Mathematik für Lehrer an Gymnasien sowie für Mathematiker in Industrie und Wirtschaft*. In the preface, the editors Behnke and Kuno Fladt stressed the fact that the work was aimed above all at teachers: "They have always been uppermost in our thoughts. The destiny of future generations of mathematicians depends on their mastery and their love of our science" (p. V, our translation).[56] Each article has two authors, one a university professor, the other either a high school teacher or someone coming from this career.

Behnke understood what had to be improved in the activities of ICMI and had invested a great amount of effort in revitalising the Commission, but the old agenda was no longer suitable for the changing times. A second turning point – not only political but also cultural – was necessary. This second step was taken by Freudenthal, whose broad mathematical knowledge was joined by a talent for organization and an independent spirit. At the beginning of his mandate, during the meeting of the Executive Committee of ICMI held in Utrecht (August 26, 1967), he remarked that the practice of quadrennial reports at the International Congresses of Mathematicians was not a good one because the national reports were generally useless, so he proposed the idea of an ICMI congress to take place the year

53. *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.

54. Program of Work of the International Commission for Mathematical Instruction for the period of 1955/58, in *IA*, 14 A, 1955-1957; see also *Rundschreiben Nr. 1 Betr: Einladung zur Mitarbeit in dem Arbeitskreis des Deutschen Unterausschusses der Internationalen Mathematischen Unterrichtskommission* (10.2.1955) in *IA*, 14 A, 1955-1957.

55. *Program of Work of the International Commission for Mathematical Instruction for the period of 1955/58,* in *IA*, 14 A, 1955-1957.

56. The original text is: «An sie ist immer zuerst gedacht worden. An ihrem Können und ihrer Liebe zu unserer Wissenschaft hängt das Schicksal des kommenden Geschlechtes an Mathematikern».

before the International Congress of Mathematicians, with invited lectures and communications. He also suggested that future congresses not only include presentations on how to deal with the topics of programs and school organization as was done in the past, but new topics as well, such as motivation, comparative evaluation of the contents of mathematics courses, criteria of success; evaluation of the results of research in mathematics education, research methodology, etc.[57] Other topics would be added later. Moreover, since the level of *L'Enseignement Mathématique* was too high for teachers and more oriented to mathematical research,[58] André Revuz, member of the Executive Committee of ICMI, solicited the founding of a new journal expressly aimed at professors of secondary school. As shown by the correspondence held in the ICMI Archives (see Arzarello *et al.*, to appear), Freudenthal carried out these two initiatives without consulting the IMU.

On December 2, 1967 IMU secretary Otto Frostman wrote to Freudenthal in an attempt to dissuade him from both initiatives:

> I must admit that I am not too happy about the new pedagogical journal. Do you really think that there is a market for two international journals of that kind (I do not)? If you are not satisfied with *L'Enseignement*, ICMI's official journal, perhaps it would be better to try to reform it. And I am afraid too that in a new journal the "modernizers" of the extreme sort would try to be very busy. At least I ask you to be cautious. I can agree with very much of your criticism of the meetings of ICMI at the International Congresses, but I am not sure that ICMI should isolate itself from those who have, primarily, a scientific interest but who have, nevertheless, very often taken part in the discussions of ICMI. And a special ICMI congress in France in 1969 will cost a lot of money.[59]

On December 20 Freudenthal replied:

> I would like to reassure you about the new pedagogical journal. The provisional list of editors does not include any "radical". In spite of its name, *Enseignement* has never been a pedagogical journal. Its contributions on education were not pedagogical but organisatory [sic] and administrative. I do not believe it is possible to reorganize a journal so fundamentally.[60]

In March 1969 Frostman complained about not having received any report on ICMI activities.[61] ICMI secretary Delessert answered him, with two main items of news. The first

57. See See *EM*, 1967, s. 2, 13, 245-246, (Giacardi 2008, *Timeline* 1967-1971), and (Furinghetti *et al*., 2008).

58. See (Furinghetti, 2009).

59. Frostman to Freudenthal, December 2, 1967, in *IA*, 14B, 1967-1974.

60. Freudenthal to Frostman, Utrecht, December 20, 1967, in *IA*, 14B, 1967-1974.

61. Frostman to Delessert, March 16, 1969, in *IA*, 14B, 1967-1974.

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was that two issues of the new journal *Educational Studies in Mathematics* had come out, the first in May 1968, and the second in January 1969, with Freudenthal as editor. The second was that the date and place of the first ICME had been set (Lyon, August 24-30, 1969). He excused the delay in providing information by saying that the greater part of the work of secretary was performed by Freudenthal's secretary's office.[62] Thus the IMU was faced with decisions already made. In August 1969 the *First International Congress on Mathematical Education* was held in Lyon. The Congress, attended by 655 active participants from 42 countries, was a big success.[63] In the course of the ICMI meeting that took place during this first ICME, Freudenthal explained the reasons for the changes made: although the small congresses dedicated to well-defined topics can be useful, "today we need to go beyond the circle of specialists and reach the teachers, thus large congresses are necessary" (our translation).[64] He further underlined the fact that it was necessary to make it so that all the national sub-committees work and collaborate, and for this it was indispensable that people who are genuinely interested in teaching take part.

A letter written to Cartan,[65] President of the IMU, who had asked his advice regarding his successor as president of ICMI, clearly shows Freudenthal's policies and the qualities he considered essential for a incisive position in ICMI. He begins with the reflection that "the problem of CIEM is that it does not have either its own office or any other permanent centre. It depends solely on how active the president is and on the administrative assistance available to him" and thus if the president is one "less active or less inclined to innovation, the CIEM is lost." The qualities that he believed a president had to possess are:

— familiarity with questions relative to secondary or primary teaching;
— a thorough awareness of the international situation and of the international sphere of those who are concerned with teaching;
— a spirit of initiative.

He also notes that the situation could be complicated by the fact that up to that time university professors had always been chosen, taking into account their nationality.

The person that he considered "by far the worthiest and most capable from all points of view" was Revuz, but he also mentioned Willy Servais, a high school professor in Morlanwelz (Belgium), A. Zofia Krygovska, director of the Normal School in Kraków, and Bent Christiansen, director of an institute for teacher training in Copenhagen. But he feared that they would not be considered to have the "mathematical weight necessary for a president of

62. Delessert to Frostman, Riex, March 22, 1969, in *IA*, 14B, 1967-1974.

63. ICMI Bulletin, 5, 1975, 20-24 and http://www.icmihistory.unito.it/icme1.php.

64. *Compte-rendu de la séance de la CIEM tenue à Lyon, le 23 août 1969, à 14 heures, à l'occasion du premier Congrès International de l'Enseignement Mathématique*, in *IA*, 14B, 1967-1974. The original text is: « Mais aujourd'hui, il faut dépasser le cercle des spécialistes pour atteindre tous les enseignants d'où la nécessité de grandes réunions ».

65. See the original text in the Appendix 6. In what follows the passages quoted are translated by the authors.

the CIEM." Freudenthal named others as well: Henry O. Pollak (Bell Telephone Laboratories, USA) and the Indian Jagat Narain Kapur of the Indian Institute of Technology in Kanpur, India, about whom he noted:

> If I had to nominate a president from the CIEM who is not from Europe or America, I would choose him. But the CIEM would have to have more ample means at its disposal to be able to permit itself a president far from Europe and America. Kapur has published a lot on teaching, he is a man whose ideas are fresh and solid, he is active, and he is a good mathematician. It is a shame that he has never been made a part of the CIEM. In any case he deserves to become a Member at large. The same is true of the others I have mentioned.

Only at the end did he note that since the second ICME would take place in Exeter, it was natural to seek a president from Great Britain: he cited Maxwell, Robert Cranston Lyness, and Brian Twaites, but not Lighthill, who would actually become the president.

These reflections are indicative of the importance he placed on a thorough understanding of questions relative to education, as well as his open-mindedness towards secondary school teachers, women, and emerging nations.

Freudenthal actually grasped the spirit of the times and the new needs of society. It is therefore clear why the change promoted by him was radical, and after his mandate things were no longer the same: on one hand, mathematics education was becoming an autonomous discipline with its own congresses and journals; on the other, ICMI was performing a 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.

APPENDIX

Documents[66]

1. M. Stone to A. Châtelet, November 3, 1952

303 Eckhart Hall
University of Chicago
Chicago 37, Illinois

November 3, 1952

M. A. Châtelet
Doyen de la Faculté des Sciences
Université de Paris
Paris, France

Dear M. A. Châtelet:

I am very happy to learn that the International Commission for Mathematical Instruction recently held a meeting and organized itself under your chairmanship. I hope that the Executive Committee of the Union will soon receive from you a report of the meeting together with the budgetary proposals which were adopted there.

At the present time I have seen only a somewhat informal communication from Professor Hille. From this I am led to believe that there will be need for bringing about a clear understanding of the position of the Commission as a Commission of the International Mathematical Union. I already called Professor Behnke's attention to the bearing of the statutes and bylaws of the Union upon this question, but have received no reply from him. I feel sure that there will be no great difficulty in working out a suitable method of transacting the business operations of the Commission under the statutes and bylaws of the Union. However, there is one proposal made by the Geneva meeting which must be very carefully discussed before any action is taken. It is my understanding that the Commission has proposed an arrangement whereby it will seek the adherence of the several nations and set up special nations committees in the adhering nations to work with the Commission. I believe that activity of this kind is inappropriate for a Commission of the Union and it would lead to intolerable confusion as to the relations between the Union, the Commission, and the nations adhering to one or the other. My own immediate suggestion as to the proposed way of handling the relations between the Commission and the na-

66. Documents 3, 4, 5 have been already inserted in (Arzarello *et al*., to appear).

tional bodies interested in supporting it would be to urge all interested nations to adhere to the Union and to arrange for the appointment of suitable persons to the National Committees for Mathematics which have to be set up as part of the procedure of adhering to the Union. The Commission could then arrange for direct contacts with these National Committees by cooperating as members or as liaison agents appropriate members of the National Committees. I would welcome your own suggestions for reaching a suitable method of procedure.

During the last six month I have been trying to make contacts in UNESCO which would be useful to your Commission. Some of the most important information I have gathered should already have been available to the Commission at the Geneva meeting as I had Professor Bompiani send copies of the correspondence containing it. I believe it is quite clear that UNESCO will have a rather limited interest in the work of the Commission since its educational program is devoted mainly to the primary level. I hope that eventually we shall be able to persuade UNESCO to be interested in secondary education and even in university education so far as it affects to the under-developed areas.

With best personal greetings,

Sincerely yours
Marshall H. Stone, President

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2. M. Stone to A. Châtelet and to H. Behnke, Rome, September 21, 1954

INTERNATIONAL MATHEMATICAL UNION
Istituto Matematico – Città Universitaria – Roma – Italy

Rome, September 21, 1954

Professor A. Châtelet, Chairman,
I.C.M.I., Paris, France

Professor H. Behnke, Chairman Elect,
I.C.M.I. Münster, Germany

Dear Colleagues,

Following the meetings of IMU at the Hague and of ICMI in Amsterdam, I hope you will permit me to take a few comments on the actions taken there – comments which I would like to place on record for the Executive Committee of IMU as well as for your Commission, and which I am therefore transmitting also to Professor Hodge and Mac Lane because of their interest in both connections.

The organisation of ICMI adopted by the General Assembly of IMU confirms the general scheme which has been worked out over the last two years or so, but it also emphasises and clarifies the position of ICMI as an agency of IMU. The fact that members of ICMI, the chairman included, are to be named (and indeed have been named for the period January 1, 1955 to December 31, 1958) by the General Assembly, and the fact that the Executive Committee of ICMI as to be chosen in part from this group of ten Members, establish the responsibility of ICMI to the General Assembly of IMU. On the other hand the fact that the two delegates named by each interested adhering country through its National Committee for Mathematics are members of ICMI on equal footing with the members designated by IMU emphasizes the importance of direct national participation in the work of ICMI. It is clearly desirable that the interested nations should have an opportunity of changing their delegates for the period January 1, 1955 to December 31, 1958, if they so wish. In principle, I suppose, it would be appropriate for any participating nation to change its delegates, at any time it may desire to do so, provided the appropriate notifications are made to ICMI and to IMU. In practice it would clearly be desirable for such changes to take place normally at the time when the membership of ICMI is reconsidered by the General Assembly of IMU at its regular meetings. It is also essential that the national delegates of the participating nations should be able to take part in the election of the officers of ICMI (other than the Chairman who is named by IMU) and of the additional members of the Ex-

ecutive Committee of ICMI, since it is in this way that the participating nations can give direct expression of their views as to the organisation and aims of ICMI (less direct expression having already been given through the General Assembly of IMU).

It is my understanding that at Amsterdam there was some expression by Dutch speakers of dissatisfaction with the choice of Mr. Gerretsen as a member of ICMI for the period beginning January 1, 1955. Possibly this dissatisfaction arises out of a misunderstanding. It is evident that the Netherlands is free to determine its two national delegates in any way it may decide as convenient and appropriate. It would certainly be reasonable for the delegates to be chosen among experts in secondary, or even primary, instruction, if that were agreeable to the various groups influencing the decision. In principle, it seems to me, ICMI should have a strong element of such experts, and in consequence I doubt that there is a substantial conflict in the case of Mr. Gerretsen. It must be stated, however, that as a result of the elections by the General Assembly of IMU Mr. Gerretsen is to remain a member of ICMI *as a representative of I.M.U.*, until the next elections or until the General Assembly decides to replace him for one reason or another (in which case the General Assembly would not be bound to replace him by a citizen of the Netherlands)

The arrangements for financial support of ICMI should be a matter for very serious consideration in the immediate future. There has not been sufficient awareness till the recent of the very strong limitations placed upon the use of funds deriving from UNESCO via ICSU. The realisation that these funds are to be used *exclusively* for travel and subsistence expenses incidental to meetings of ICMI underlines the necessity for uncovering other sources of support for the work of ICMI. At the first General Assembly of IMU at Rome the discussions brought out the hope that ICMI would be able to mobilize support from the Ministries of Education in the participating nations and from the various national organisations directly interested in the problems of mathematical instruction. So far we have virtually nothing to mobilize such support, and we cannot go on much longer without making a real effort along this line. I have no doubt the newly elected Executive Committee of IMU will be prepared to cooperate closely with ICMI in this effort; but the moving impulse must come from ICMI itself.

The support which will be given to ICMI will depend largely upon the attractiveness of the general program formulated and announced by ICMI. Consequently it is of the first importance that a general program which has long-range, fundamental objectives, should be formulated over the next year or two. Such a program should take cognizance of the scientific advances made possible in the techniques of instruction as a result of psychological investigations, as well as of the needs for curricular reform presented by changing social conditions. It should appeal to the countries where new educational systems are being introduced as well as to the countries where established systems are undergoing the social influences characteristic of our times. Its aim should be better teaching of more mathematics for more students at each successive level in the hierarchy of mathematical instruction. The various contributions to the basis of such a program already made at Amsterdam, whether in the form of addresses or in the very impressive exposition of factual material, reminds us that the work of ICMI will depend upon access to a good

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working library of reference documents, whether its own or that of some cooperative but independent organisation.

The meeting of ICMI which is planned to be held in Paris in October should be able to do many useful things toward starting off the new Commission which will succeed it on January 1 next. The presentation to the new Commission of a slate of officers and members of the Executive Committee would be helpful as the new Commission could then proceed at once to elect its officers and organize itself as required by the Statutes of IMU and the recent action of the General Assembly at the Hague. More important a start can be made toward developing a program which will meet the requirements of the General Assembly as expressed by a resolution passed at the Hague and which will open a brilliant future for ICMI

With felicitations for what has already been accomplished under the leadership of Professor Châtelet, and the highest hopes for what will be accomplished following the lead of Professor Behnke, I remain.

Faithfully yours
(Marshall E. Stone)
President IMU

3. Excerpt from *Report of the president* [H. Behnke] *of the International Commission of Mathematical Instruction to the president of the International Mathematical Union*. April 20, 1955.[67]

[...] 5. *The work of the ICMI during 1955/58*

The program of work planned for the ICMI cannot be adopted before the session of the newly constituted Executive Committee has been held. The first session of this Executive Committee will probably take place in Geneva this coming July. But, according to a discussion on the work of the ICMI for the next years at the last session of the former Executive Committee in Paris, Oct. 1954, the following program was suggested:

1) the proposition is to be made to the national sub-commissions to work on the subject of "The Scientific Basis of School mathematics" and to compose for their countries or groups of countries a book for the scientific consultation of the teachers. For this book it is of primary importance that teachers of mathematics of all levels cooperate.

I regard it is a special, honorary mission of the ICMI to establish a contact among the teachers of all levels. The teacher have to get interested in the research work, and those active in the field of research have to get interested in the work of the teachers. I have already succeeded in being assured of the readiness of cooperation for the second volume of the German ICMI report ("Mathematical Instruction for the early Youth in the Federal Republic of Germany") from professors of the academies for education (Pädagogische Akademien) and through them from the teachers of primary level.

At the interim meeting in 1956 (symposia for the scientific basis of school mathematics) the experiences shall be compared gathered by the different nations in projecting this book.

In this context I may mention the suggestion of create an international encyclopedia of elementary mathematics. I do not yet see a way to realize this project because the school systems and therefore the material of instruction deviate too considerably from one another in the different countries. Yet this project will be submitted at the session of the Executive Committee in July. This way it may be possible to approach the suggestion made by M. Stone to create an international work of instruction. This plan might at first sound simply phantastic for everyone who knows the diversity of national conditions of instruction in different countries. It would, indeed involve an entirely new way of working for the ICMI since, for the first time, it would not simply have to coordinate national work, but would have to realize an important international work.

As a matter of course, considerable financial means would be necessary for the realization of such a project, because the different collaborators would have to be in constant communication during the time of accomplishing this work.

67. *IA*, 14A, 1955-1957.

2) The inquiry "The part of Mathematics on Contemporary life" has to be examined more fully and with much more gravity than has been done up to new. The investigation of this bulk of questions is closely connected with the technical development of the different countries.

In America, f. i., there exists a supervision of production at the instant of production. This plays a particularly important part in iron industry of small quantities, thus preventing refuse. The establishment of such a supervision and such a controlling office is, to a high degree, dependent on exact mathematical calculations. Our colleague Ulrich Graf, who died last year, was about to introduce the same establishment in Germany. If this is done on a larger scale in the region of the Ruhr, for example, large numbers of mathematicians will be required. [...] Similar questions arise for the use of large-size calculating machines in the industrial field. It is thinkable that, in the coming years, the applications of these machines might expand enormously. This involves the new vocation of the industrial mathematician. The firm Siemens-Halske in Munich has now opened a large department for the development of calculating machines and has already called from Münster four of ours of young doctors of mathematics.

Thus questions are raised which have to be discussed on an international basis.

All pains taken by the ICMI can be summed up by this formula:

To contact people of different qualities and abilities, people of different nations and different teaching professions (as long as they are seriously interested in mathematics) in order to make them work together.

There resides the great obligation and chance for the ICMI.

I personally try to be an example for this possible, rather comprehensive kind of work

1) with my meetings at Whitsuntide aiming at the maintenance of relation between universities and schools (Pfingsttagungen zur Pflege des Zusammenhangs von Universität and Gymnasien); regular attendance of approximately 250 persons;

2) with the international interim meetings of the ICMI which will be introduced (symposia for school mathematics) and the sessions of the Section at international congresses;

3) with our series of books on mathematical instruction in the different countries;

4) with the national encyclopedias of school mathematics;

4a) possibly with an international encyclopedia of school mathematics.

4. [*Memorandum von Herrn Behnke über die Bildung von Gruppen*][68].

Suggestions on the subject of forming „Regional Groups" within ICMI

A) Since its foundation in 1908 in Rome, ICMI's aim has been to compare experiences in the teaching of mathematics in all types of educational establishments, and to discuss possible reforms in the teaching of mathematics. This program includes the following points:

(1) Reports on mathematical instruction

(2) Discussions on eliminating obsolete parts of material hitherto used

(3) Suggestions and discussions on introducing new mathematical points of view into curriculum, (for instance to introduce the concept of "structure" already at Secondary School level)

(4) To establish and cultivate contacts between various types of schools – as far as mathematical teaching is concerned – particularly where pupils progress from one school to the other.

B) In dealing with any particular problem included in this general program, we must be quite clear about the particular age group and the particular educational level of those pupils to whom this problem applies. But this is not easy because conditions vary considerably from country to country, as the national school systems are very often based on different principles. Therefore the work of the *National Sub-Commissions* must be the basis of all life in ICMI. It is then one of the main tasks of ICMI to create and cultivate the exchange of ideas and experiences between the sub-commissions of different countries. This exchange is obviously easiest between those countries where the school systems are similar. Therefore, it is rather natural that the sub-commissions of the countries sharing the old European traditions in educational matters (namely France, Germany, Great Britain, Italy, Scandinavia etc.) – which I shall briefly call the WNE-countries (*W*est and *N*orth *E*uropean) – have up to now found closer contact with one another than with national sub-commissions from other parts of the world. Consequently the activity of ICMI during the 50 years of its existence was mainly concerned with these WNE-countries.

If ICMI now makes the attempt to extend its activities to all parts of the world, then it would be appropriate to form "*groups*" of national sub-commissions, so that countries whose educational systems are similar, belong to the same group. This is in accordance with the resolution passed by the General Assembly of the IMU at St. Andrews, August 1958.[69]

C) At the International Congresses of Mathematicians, ICMI plays a relatively small role, since these congresses are dominated by reports and discussions on matters of research. It might, therefore be more appropriate for ICMI to hold smaller symposia in the years between Congresses. This has, in fact, been the case in the past; especially during the periods 1909-1914 and 1953-1958, such symposia have taken place annually. For financial reasons, it is necessary to restrict each of these meetings to some countries not too far from each other. Thus the geographical aspect must also be considered in the formation of the proposed groups. Fortunately, these

68. *IA*, 14A, 1958-1960.

69. See (Giacardi 2008), 1955-1959.

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two aspects, the similarity of educational systems and the geographical one coincide in the most cases.

Led by these considerations, I make the tentative suggestions that to begin with, the following "Regional Groups" of ICMI must be formed:

1. The WNE-countries
2. The East European Countries
3. South East Asia
4. Central and South America
5. Australia and New Zealand.

One might imagine that very large countries, like USA and USSR, would have little interest in joining a regional group.

The organization of the symposia mentioned above would be such that each year a certain group arranges a meeting in which the reports and discussions deal in first place with the particular interests of the members of that group. However representatives of other groups should be invited to take part. With regard to financial arrangements, it remains to be seen whether enough money would be available from IMU or whether the group itself would have to find other resources.

D) The climax of the whole work would be a meeting of all national sub-commissions (at present numbering 23). It would be appropriate for this to take place in connection with each International Congress of Mathematicians.

5. *Proposition sur l'enseignement mathématique*.[70]

A la suite de l'enquête de DIALECTICA, les professeurs de mathématique* rassemblés au colloque de Lausanne[71] ont constaté qu'un accord presque général est actuellement réalisé sur les points suivants:

1. La mathématique est une activité inaliénable de l'esprit humain. Tout enfant a le droit d'y être formé.

2. Dans un monde changeant, il convient que cette formation éveille et développe plutôt des aptitudes d'action intellectuelle qu'elle ne fixe des connaissances.

3. La mathématique évolue de plus en plus vers une science générale des structures. Celles-ci lui confèrent un pouvoir considérable d'application, d'information et d'unification. La connaissance et la maîtrise de ces structures, leur mise en ouvre dans la saisie de la réalité sont les vraies buts de l'enseignement mathématique.

4. Certaines de ces structures ont un caractère élémentaire: il y aurait intérêt à chercher à s'en servir dès l'enfance.

5. Un certain nombre de structures plus élaborées devraient être acquises au terme des études secondaires.

6. La réalisation d'un niveau valable exige une formation mathématique et pédagogique appropriée des maîtres.

7. La réforme de l'enseignement mathématique doit être considérée comme un phénomène permanent. Cela implique une formation continue des maîtres appuyée sur une recherche pédagogique suivie.

8. En ce domaine, une collaboration efficace sur le plan mondial devient indispensable. Il est urgent de fonder un organisme international des informations en matière d'enseignement mathématique.

Lausanne, le 18 janvier 1967

70. *IA*, 14B, 1967-1974. These principles were published as "Propositions on the teaching of Mathematics" in the first issue of the journal *Educational Studies in mathematics* (1968, 1: 244).

71. This is the UNESCO Colloquium in Lausanne on "Coordination of Instruction of Mathematics and Physics" (January 16-10, 1967).

*A savoir: M. W. Servais (Belgique), M. R. Guy (Canada), M. J. Lichtenberg (Danemark), M. C. Pisot (France), Mme [illegible: P. Gadon ?] et M. A. Renyi (Hongrie), M. C. Cattaneo (Italie), M. H. Freudenthal et M. L. N. H. Bunt (Pays-Bas), M. Z. Krygowska et M. S.Straszewicz (Pologne), M. E. Blanc, M. A. Delessert, M. E. Emery, M. F. Gonseth, M. K. Grimm, M. J. de Siebenthal (Suisse) et M. I. Smolec (Yougoslavie).

6. H. Freudenthal to H. Cartan, Utrecht, June 29, 1970[72]

MATHEMATISCH INSTITUUT
DER RIJKSUNIVERSITEIT TE UTRECHT

Utrecht, le 29 juin 1970

Professeur Henri Cartan
95 Boulevard Jourdan
75 PARIS (14) Frankrijk

Cher Ami,

Je suis heureux que vous me posiez la question da ma succession à la présidence de la CIEM. Je désire que l'existence et l'activité de la CIEM soient bien assurées quand je sors de la chaire de Président.

Le problème de la CIEM est ce qu'elle n'a ni de bureau ni d'autre noyau permanent. Elle dépend de l'activité du président et des facilités administratives dont il dispose. Jusqu'alors presque chaque président a commencé de nouveau; si c'était un homme moins actif ou moins inventif, la CIEM serait perdue. C'est alors plus important qu'il n'a jamais été, parce que le président de la CIEM doit jouer un grand rôle dans la préparation du Congrès de 1972 qui aura lieu à Exeter (Gr. Br.). Si le président de la CIEM n'est pas assez actif, l'organisation de tel congrès internationaux de l'enseignement glissera des mains de la CIEM.

Je pense que le président de la CIEM doit remplir les conditions suivantes:

état de préoccupations plus que superficielles et continues depuis des années avec les questions de l'enseignement secondaire ou même primaire,

familiarité avec la situation internationale et le milieu international de ceux qui s'intéressent à l'enseignement mathématique,

goût d'initiative et d'activité.

Il y aurait assez de gens qui pourraient satisfaire à ces demandes, mais des conditions supplémentaires pourraient compliquer le choix.

Jusqu'alors on à toujours choisi un professeur d'université de poids scientifique pas trop léger et on à tenu compte de la nationalité du candidat.

Je n'ai aucun doute que parmi ceux que je connais et que j'ai considérés, de très loin le plus digne et le plus capable en quelque respect que ce soit et qui continuera et revivra le mieux les affaires, est A. Revuz, mais je crains qu'après deux présidents de nationalité française on n'ose pas donner à la CIEM un troisième.

D'autre noms: W. Servais, professeur de lycée à Morlanwelz (Belgique), Mme A. Z. Krygovska, directeur d'école normale de Cracovie, M. B. Christiansen, directeur d'un institut de recyclage

72. We thank Manuel Ojanguren for informing us about this letter held in the *Fonds de Rham* (Lausanne).

de maîtres à Copenhague, me semblent excellents; ils sont mieux [...] ne suis pas sûr qu'on leur attribue le poids mathématique nécessaire au président de la CIEM. Un cas un peu différent serait M. H. O. Pollak (Bell Telephone Laboratories USA), excellent et même brillant et bon mathématicien, mais encore une fois américain. Un homme que je ne connais personnellement que depuis quelques mois et qui me semble excellent serait M. J. N. Kapur de l'«Indian Institute of Technology, Kanpur, India»; je regrette que je l'aie pas connu quand nous avons choisi les conférenciers de Lyon et cherché en vain quelque représentant de l'Asie. Si je devais nommer un président de la CIEM qui ne vient pas de l'Europe ou de l'Amérique, ce serait lui que je choisirais. Mais le CIEM devrait disposer de moyens plus amples qu'alors, pour se permettre un président loin de l'Europe et de l'Amérique.

M. Kapur a publié beaucoup par rapport à l'enseignement, c'est un homme avec des idées aussi fraîches que solides, il est actif et bon mathématicien. C'est dommage qu'il n'a jamais appartenu à la CIEM. En tous cas, il mériterait de devenir Member at large. Le même vaut pour les autres que j'ai mentionnés.

Vu que le second Congrès de l'Enseignement Mathématique aura lieu en Grande Bretagne, il serait assez naturel de chercher un président britannique. En Grande Bretagne il y a un grand nombre d'hommes bien capables d'être président de la CIEM. E. A. Maxwell a longuement et excellemment servi la CIEM, M. R. C. Lynnes [sic] serait un candidat aussi digne. Il me semble que, chez lui et à l'étranger M. B. Twaites jouit de la plus grande autorité. Il est toujours enthousiaste (parfois un peu trop, ce que j'aime), il n'aime pas trop les formalités (ce qui peut être un avantage et un désavantage).

Voila mes considérations et mes candidats. Peut-être j'ai oublié l'un ou l'autre. Le choix sera difficile, mais j'espère qu'il serait un bon choix.

Cordialement
(H. Freudenthal)

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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. (2008), «Moments in the life of ICMI». In: MENGHINI, Marta; FURINGHETTI, Fulvia; GIACARDI, Livia; ARZARELLO, Ferdinando (eds.). *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, 9-24

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.

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.

DONAGHUE, E. (2008), «The inception of ICMI: David Eugene Smith and the founding of ICTM». In: MENGHINI, Marta; FURINGHETTI, Fulvia; GIACARDI, Livia; ARZARELLO, Ferdinando (eds.). *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, 205–210.

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 publiées 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: CORAY, Daniel; FURINGHETTI, Fulvia; GISPERT, Hélène; HODGSON, Bernard R.; SCHUBRING, Gert (eds.). *One hundred years of L'Enseignement Mathématique*, *L'Enseignement Mathématique*, Monographie **39**, 19-46.

FURINGHETTI, F. (2007), «Mathematics education and ICMI in the proceedings of the International Congresses of Mathematicians». *Revista Brasileira de História da Matemática*, Especial no 1 - Festschrift Ubiratan D'Ambrosio, 97-115.

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.

FURINGHETTI, F. (2009), «The evolution of the journal *L'Enseignement Mathématique* from its initial aims to new trends». In: BJARNADÓTTIR, Kristín;. FURINGHETTI, Fulvia; SCHUBRING, Gert (eds.). *"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, 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. (to appear), «From Rome to Rome: Events, people, and numbers during ICMI's first century», In *Proceedings of ESU-6*.

FURINGHETTI, F.; MENGHINI, M.; GIACARDI, L.; ARZARELLO, F. (2008), «ICMI Renaissance: the emergence of new issues in mathematics education». In: MENGHINI, Marta; FURINGHETTI, Fulvia; GIACARDI, Livia; ARZARELLO, Ferdinando (eds.). *The first century of the International Commis-*

sion on Mathematical Instruction (1908-2008). Reflecting and shaping the world of mathematics education, Rome: Istituto della Enciclopedia Italiana, 131–147.

GERRETSEN, J. C. H.; DE GROOT, J. (eds.) (1957), *Proceedings of the International Congress of Mathematicians*, Groningen, E. P. Noordhoff N. V.; Amsterdam: North-Holland.

GIACARDI, L. (2008), *Timeline*, in (Furinghetti; Giacardi, 2008).

GIACARDI, L., (2009a), *Documents*, in (Furinghetti; Giacardi, 2008).

GIACARDI, L., (2009b), «The Italian contribution to the International Commission on Mathematical Instruction from its founding to the 1950s». In: BJARNADÓTTIR, Kristín;. FURINGHETTI, Fulvia; SCHUBRING, Gert (eds.). *"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, 47-64.

HODGSON, B. R. (2009), «ICMI in the post-Freudenthal era: moments in the history of mathematics education from an international perspective». In: BJARNADÓTTIR, Kristín;. FURINGHETTI, Fulvia; SCHUBRING, Gert (eds.). *"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, 79-96.

HOWSON, A. G., (1984), «Seventy-five years of the International Commission on Mathematical Instructio», *Educational Studies in Mathematics*, **15**, 75-93.

ICMI website http://www.mathunion.org/icmi/home/

KILPATRICK, J. (2008), «The development of mathematics education as an academic field». In: MENGHINI, Marta; FURINGHETTI, Fulvia; GIACARDI, Livia; ARZARELLO, Ferdinando (eds.). *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, 25-39.

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: MENGHINI, Marta; FURINGHETTI, Fulvia; GIACARDI, Livia; ARZARELLO, Ferdinando (eds.). *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. 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: CORAY, Daniel; FURINGHETTI, Fulvia; GISPERT, Hélène; HODGSON, Bernard R.; SCHUBRING, Gert (eds.). *One hundred years of L'Enseignement Mathématique*, *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), 113-130.

SMID, H., 2009, «Foreign influences on Dutch mathematics teaching». In: BJARNADÓTTIR, Kristín;. FURINGHETTI, Fulvia; SCHUBRING, Gert (eds.). *"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, 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.

SMITH, D. E. (1913), «The International Commission on the Teaching of Mathematics», *Educational Review*, **45**, 1-7.

DOI: 10.2436/20.2006.01.149

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.

 DOI: 10.2436/20.2006.01.149