

SNAPSHOTS FROM THE 1960'S: TENSIONS AND SYNERGIES IN THE EMERGING OF NEW TRENDS IN MATHEMATICS EDUCATION

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To Günter Törner

Je n'aspire pas à changer la société, mais malgré des désillusions que j'ai éprouvées, je crois toujours qu'on peut changer peu à peu l'enseignement [...].
(H. Freudenthal, as quoted in (Adda, 1993, p. 12)²

Introduction

In September 1997 a school teacher in California posed to the web Discussion List on the History of Mathematics³ the following question: "What happened in mathematics in the year 1968?". The reason for this question was an interdisciplinary theme weekend on the year 1968 planned in his school (grades 9-12, academically strong). I have recorded four answers. One mentioned the final computations made and programmed to send a manned vehicle from the earth to its moon, and then return. The second pointed out that 1968 was the year of the famous month-long Global Analysis summer school at Berkeley. The writer also evoked vividly the particular climate of the hippie period in this University. For another respondent 1968 was the year in which V. Kac and R. Moody independently introduced and classified the class of Lie algebras now called Kac-Moody algebras. The last responder resorted to St Andrew Archive⁴ and found that in 1968 the following known mathematicians died: S. N. Bernstein, J. F. A. Delsarte, A. O. Gelfond, L. D. Landau (1962 Nobel Prize for physics), K. Loewner, L. Roth.

It is my opinion that an analogous question referring to mathematics education ("What happened in mathematics education in the year 1968?") would have as a first answer "the foundation of the journal *Educational Studies in Mathematics*". In this paper I outline some elements that are behind this event and make this journal a milestone in the history of mathematics education. The recent developments, the policy, and the place in the international panorama of *Educational Studies in Mathematics* have been outlined and discussed when the fiftieth volume was issued and when the centenary of its predecessor

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² I do not aspire to change society, however, in spite of some disillusion I felt, I always trust that little by little we may change teaching. [In the present paper the translations are mine].

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⁴ <http://www-groups.dcs.st-and.ac.uk/~history/index.html>

journal *L'Enseignement Mathématique* was celebrated, see (Furinghetti et al., 2003; Hanna, 2003; Hanna & Sidoli, 2002). The focus of the present paper is in the factors, which raised the need of founding such a journal. My main sources will be journal itself and *L'Enseignement Mathématique*; moreover I'll use some data gathered in my study on activities relating to mathematics education in the proceedings of the quadrennial International Congresses of Mathematicians (see Furinghetti, to appear). The question underlying the present paper is the tormented relation between mathematicians and mathematics educators. Which better subject to celebrate Günter Törner, who was and is so successful in dealing with this relation?

L'Enseignement Mathématique, ICMI, IMU, ICM

The journal *Educational Studies in Mathematics* does not come out of the blue: its roots and antecedents rely in the history of the journal *L'Enseignement Mathématique* and in the links of this late journal with ICMI.

L'Enseignement Mathématique was founded in 1899 by the French C. A. Laisant and the Swiss H. Fehr. As discussed in Furinghetti (2003), the aim of this journal was to foster communication, internationalization and solidarity in mathematical instruction around the world. The modern settlement of various nations was completed almost everywhere and there was the need to build instructional systems. The information on national systems of instructions and the comparison of curricula were important in such a construction and the journal promoted this policy of information: in this way it sowed the seed for the creation of ICMI (International Commission on Mathematical Instruction), which happened in the International Congress of Mathematicians of Rome (6-11 April 1908). The ideas of communication and internationalization were spreading also in the world of the professional mathematicians. Laisant himself, director with É. Lemoine of the journal *L'Intermédiaire des Mathématiciens* launched in this journal (1894, 1, question 212, p. 113) the idea of an international congress of mathematicians. As we know this idea was well received by the mathematicians and the first International Congress of Mathematicians took place in Zurich (9-11 August 1897). This short historical outline⁵ evidences a particular link of the world of mathematical instruction/education and the world of mathematicians. ICMI (until the 1950s mainly indicated with the French acronym CIEM or the German IMUK⁶) was born inside the International Congress of Mathematicians and the mandates for its future activities and its committees were decided in connection with these Congresses. Thus the life of ICMI paralleled the life of the community of mathematicians. Wars had been shocking events in these lives. Wars, indeed, are storms that swap away existing situations. This, in particular, may happen to international institutions, which, for their very nature, are based on values such as solidarity, spirit of collaboration and wish of communicating that wars put in crisis. The life of ICMI was signed by the two World Wars. For example, after the Versailles Peace Treaty the dissolutions of international scientific associations provoked the first lethargy of ICMI, which lasted until the resurrection in the ICM-1928 (Bologna). The Second World War stopped again the activities and the new resurrection happened in 1952 with a new name and acronym - International Mathematical Instruction Commission (IMIC) – that soon was changed into the present name International Commission on Mathematical Instruction (ICMI). In the ICM-1954 (Amsterdam) ICMI was lively present, see (Furinghetti, to appear). Since then the new life of ICMI developed towards the present pattern of a pathway with lights and shadows.

⁵ The history of IMU and its links with the related commissions is in (Lehto, 1998). For the history of ICMI see the website built on the occasion of the celebration for the centenary of ICMI < <http://www.dm.unito.it/icmi/>>.

⁶ CIEM stands for Commission Internationale de l'Enseignement Mathématique, IMUK stands for Internationale Mathematische Unterrichtskommission.

Two strong elements of continuity characterize the period 1908-1954: *L'Enseignement Mathématique* and H. Fehr. Since the foundation of ICMI the journal was its official organ: it published reports of the various countries, announcements and information, minutes of ICMI meetings, ICMI inquiries. H. Fehr was Secretary General of ICMI until 1952; in 1954 (the year of his death) he was appointed as honorary president of ICMI. It is unanimously acknowledged that he has been the real soul of ICMI, the indefatigable ferryman of the international mathematical instruction world from the nineteenth century to the twentieth century.

H. Fehr's death marked the end of an era: society was changing and a new generation of ICMI members was emerging. Mathematics itself was undergoing changes in paradigms. At the ICM-1954 in Amsterdam (the second after the war) J. A. Schouten in his presidential address drew the attention to "a fact which was perhaps not so clear four years ago, but which is absolutely clear now: *the place of mathematics in the world has changed entirely after the second war*" (Gerretsen & de Groot, 1957, Vol. 1, p. 143); moreover he stressed the increasing importance of "our modern computing machines" (ibidem, p. 145). The new role of mathematics was promoted by advances in technology and the pressures by governments to give an education adequate to the changed setting of the world. The concern for the iron curtain was pushing towards strong developments in technology and mathematics instruction was perceived as an important factor of power for the nations.

In the first General Assembly held in Rome (9 March 1952) the International Mathematical Union had reconstituted the old CIEM/IMUK under the ephemeral name of "International Mathematical Instruction Commission (IMIC)". In the general assembly of IMU (The Hague, 1 September 1954) the present name International Commission on Mathematical Instruction and the acronyms ICMI were adopted again (even if for some period translated into French in the reports published in *L'Enseignement Mathématique*). As witnessed by these reports ICMI continued its activity of inquiring and organized meetings often sponsored jointly by other bodies. The proceedings of many of these meetings were published.

After the Second World War several international organizations came into being. With at least three of them ICMI had ties by virtue of common memberships – namely, with the Commission Internationale pour l'Étude et l'Amélioration de l'Enseignement des Mathématiques, the Inter-American Committee on Mathematical Education, the Committee on Mathematics in South Asia.

There were some forms of cooperation with UNESCO – namely organization of conferences in co-operation or consultation of members, publications of reports and books. Several members of ICMI made important individual contributions to Royaumont Seminar in 1959 sponsored by OEEC⁷ and on the work on its Dubrovnik Report in 1960. A formal request was made by OEEC to ICMI in 1959 for preparing a list of outstanding mathematical texts. For a long time there has been a semi-formal understanding between ICMI and the Musée Pédagogique for the mounting of the exhibitions of books and other educational materials at the International Congresses of Mathematicians.

In spite of all these activities in the sixties ICMI was losing its centrality as regards mathematics education. In the report (International..., 1963) we see some signs of difficulties in the relationship with mathematicians. An evidence of these difficulties is the SCOTS (Special Committee on the Teaching of Sciences) affair. The affair is briefly described in the 'Report for the period 1959-1962' (International..., 1963, p. 110) as follows:

In 1960 U.N.E.S.C.O.'s Department of Natural Sciences begun discussing with I.M.U. the possibilities of formal co-operation in the field of mathematical instruction at the university level.

⁷ OEEC (Organisation for European Economic Co-operation) later became OECD (Organisation for Economic Co-operation and Development).

These discussions resulted in the conclusion of a contract for this purpose between U.N.E.S.C.O. and I.M.U. early in 1962, but the executive committee of I.M.U. decided to create a Special Committee on the Teaching of Science (S.C.O.T.S.) to handle its obligations under the contract as well as its developing general interests in the broader field of science education. A close co-operation between I.C.M.I. and S.C.O.T.S. is thus to be desired in the future.

It is likely that ICMI would have wished that SCOTS had been appointed as a sub-commission of ICMI. This episode is a step in the long-lasting history of frictions between IMU and ICMI. The point was, in the very words of Lehto (1998, p. 110)

The Executive Committee of the IMU had mixed feelings about the steps the Commission had taken. On one hand, the activity of the Commission was welcomed. But the Executive Committee wished to exercise some control over its sub-commission, which was supposed to be a link between research mathematicians and teachers and which did not possess financial resources of its own.

The frictions with the community of mathematicians are surprising if one considers that the mathematicians, F. Klein for one, were the main supporters in the first period of ICMI. But times had changed since then. The ICMI reports (International..., 1963; Commission..., 1966) show that financial autonomy from IMU was a main concern of ICMI. We wonder that another problem could have been the concern about academic positions: as a matter of fact the fifth of the 'Resolutions of the First International Congress on Mathematical Education', published in the proceedings of ICME-1 (*Educational Studies in Mathematics*. 1969-1970, 2, 135-418) claims:

The theory of mathematical education is becoming a science in its own right, with its own problems both of mathematical and pedagogical content. The new science should be given a place in the mathematical departments of Universities or Research Institutes, with appropriate academic qualifications available. (p. 416)

In the ICMI report (1966, pp. 136-137) we read that in the meeting of Paris (15 February 1964) ICMI (with the agreement of IMU) decided to acknowledge the status of national sub-commissions also to some national commissions representative of countries not belonging to IMU. Thus it was officially recognized that ICMI had a far wider target population than did its parent body IMU. In spite of the wide scope of ICMI activities, the proceedings of the ICMEs held in the 1960s (1962 in Stockholm and 1966 in Moscow) dedicated little space to ICMI. *L'Enseignement Mathématique* hosted some reports that were not published in the proceedings of ICMEs.

The 1960s were years of great ferment in the world of mathematics education. New curricular projects were springing up in many countries. The debate on modern mathematics was alive. As regards this debate *L'Enseignement Mathématique* published important papers, such as (Freudenthal, 1963; Piaget, 1966), but other arenas existed for this discussion, CIEAEM (Commission Internationale pour l'Étude et l'Amélioration de l'Enseignement des Mathématiques)⁸ for one. This commission, officially founded in 1952, had begun its activities in 1950, having C. Gattegno as promoter and animator. CIEAEM was independent from IMU and from national organizations: the members were a group of people (including school teachers) sharing common objectives as regards mathematics education and working in an atmosphere of friendly relationship. Over the years CIEAEM kept a rather informal character (only in 1996 it had a 'constitution') and new members were co-opted. In her short history E. Castelnuovo (1981) says that the aim of the commission was to stress that the mathematicians alone were not sufficient for a deep

⁸ International Commission for the Study and Improvement of Mathematics Teaching. This commission is still active (there was only an interruption from 1967 to 1969). It is usually indicated with the French acronym. For the history of CIEAEM see (Bernet & Jaquet, 1998).

study of the teaching problem: a wider view was necessary and it required the help of psychologists and pedagogists. She mentions also the influence of the young's movement in 1968 as an element influencing the view of mathematics teaching.

The backbone of CIEAEM activities were the periodical meetings of the commission restricted to the members or open to a larger audience. These latter meetings were organized as international conferences and - with some exceptions - had their proceedings. The two collective publications issued in the pioneering period illustrate the scope of the Commission in its initial years (Gattegno et al., 1958; Piaget et al., 1955). Bernet and Jaquet (1998) report the names of 23 founder members, among them J. Dieudonné (strong supporter of modern mathematics), J. Piaget and two future presidents of ICMI (H. Freudenthal, A. Lichnerowicz). It is remarkable that five of the 19 members of the editorial board of the first issue of *Educational Studies in Mathematics* appear in this list: E. Castelnuovo, L. Félix, G. Choquet, H. Freudenthal, W. Servais.

We may suppose that some of Freudenthal's ideas underlying the foundation of *Educational Studies in Mathematics* developed in the context of CIEAEM, whose meetings he attended: the perplexities about modern mathematics; the need of involving in the discussion of educational problems not only mathematicians, but also teachers and psychologists; the need for confronting also ideas, not only programs or curricula.

Freudenthal's views about modern mathematics are discussed in (Adda, 1993; Goffree, 1993). Goffree (1993) feels that at the beginning Freudenthal underestimated the impact of this movement; he also reports that he complained to have not attended the Royaumont Seminar, which prompted the New Math movement in Europe. In (Goffree, 1993, p. 29) we read that, according to Freudenthal "Too many mathematicians, who had nothing whatsoever to do with mathematics education, have been invited".

The cooperation with teachers was advocated by Freudenthal already in the programs for the period 1955-1958, as reported in (Commission..., 1955, p. 200):

Freudenthal pense qu'il faudrait que ces enquêtes suscitent un travail en profondeur; il serait souhaitable, par exemple, que des professeurs de l'enseignement secondaire puissent faire connaître leurs essais, les résultats de leurs expériences; une étude comparée pourrait alors s'instituer avec des données précises.⁹

About the object of research in mathematics education Freudenthal (1963, p. 29) wrote:

L'histoire a démontré la stérilité des problèmes d'organisation pure. Dans ces dernières années l'accent c'est porté sur les programmes. C'est inquiétant, cette activité des programmeurs. À maintes reprises j'ai insisté sur les recherches franchement didactiques. Il est vrai que jusqu'alors le résultat de mes efforts est assez maigre.¹⁰

⁹ Freudenthal thinks that it should be needed that the inquiries raise a work in depth; for example, it should be desirable that secondary teachers may let know their works, the results of their experiments; then a comparative study could be organized based on precise data.

¹⁰ History has shown the sterility of the problems of mere organization. In the recent years the attention has been directed to the programs. This activity of programmers is worrying. Repeatedly I insisted on studies actually didactical. It is true that until now the result of my efforts is very poor.

New needs in Mathematics Education

As told before the death of H. Fehr (2 November 1954) closed an era. It is announced in the last volume of the first series (1951-1954, 40, p. 3). A brief note (ibidem, p. 4) to subscribers and readers signed J. Karamata, J. Piaget, G. de Rahm informs that the last fascicule of *L'Enseignement Mathématique* had been prepared by Fehr and was published on demand of Fehr's widow. Starting from 1955 the journal would be quarterly. This last issue of the first series kept the early days format with some adaptations (see Furinghetti, 2003), namely the following sections: - general articles (methodology and various notes, history); - the organization of instruction; - report on Swiss Mathematical Society; - chronicle; - bibliographic bulletin; - the list of authors. There is also a list of the papers and the reports of ICMI published in the first 40 volumes.

The reports of ICMI appear in French and English (Commission..., 1951-1954, pp. 72-93). We read (p. 81): "At its first General Assembly, held in Rome from 9 March 1952, the International Mathematics Union reconstituted The International Mathematical Instruction Commission (IMIC) by calling upon H. Behnke (Munster, Westphalia), A. Chatelet (Paris), H. Fehr (Geneva), R. L. Jeffery (Canada), D. Kurepa (Zagreb, Yugoslavia)". The Commission met in Geneva (21-22 October 1952), in Paris (21 February 1953 and 15 January 1954). Additional members were co-opted to form the executive committee. At page 82 of this volume we read: "In his circular dated 7 May 1953, Prof. Châtelet of C.I.E.M. proposed to take: *L'Enseignement Mathématique*, well known by all readers, as the Commission's official publication."

The first meeting of the new ICMI Executive Committee took place in Geneva (2 September 1955). In the same year the first volume of the second series was issued. In the note "The review "L'Enseignement Mathématique" (Commission..., 1955, pp. 270-271) there is the presentation"

This second series will be devoted to the reform and development of mathematical instruction; it will publish articles focusing on and explaining modern theories in a manner comprehensible to non-specialized mathematicians; deal with arrangement and organization of teaching; study the psychological formation of mathematical ideas; and publish accounts of the work done and surveys carries out by the I.C.M.I. A bibliographical index will be included in each number.

The financial issues were not clearly settled by the International Mathematical Union, however "the I.C.M.I. deems it its duty to support this publication by doing its best to increase the numbers of subscribers" (s. 2, 1, p. 271). With this editorial statement the new life of *L'Enseignement Mathématique* began. The journal continued to be the official organ of ICMI, but slowly its role became less significant outside the Francophone countries. There was a tension between the use of the two languages - French and English - in the journal: ICMI report for the period 1959-1962 (M. H. Stone President) published in 1963 (s. 2, 9, pp. 105-112) is in English, that of the period 1963-1966 (A. Lichnerowicz President) published in 1966 (s. 2, 12, pp. 131-137) is in French with the old acronym of CIEM.

The problem of language is only one reason of the journal's decline as an educational organ. As a matter of fact, on the one hand, gradually its format changed into the usual format of mathematical journals and often the published papers had no relation with instruction/education. On the other hand, the developments of society and school made the mere study and comparison of curricula and programs - which was the initial objective of the journal - inadequate to face the complexity of the educational problems. In the title of the short lecture delivered by L. N. H. Bunt (from the Institute of Education of Utrecht) at the ICM-1954 in Amsterdam there is the new expression "didactical research", which reveals the emerging orientation in mathematics education. The decline of ICMI and the problematic relation with mathematicians were other reasons of decline.

The minutes of the ICMI session (in the journal still CIEM) held in Utrecht (26 of August 1967) gave the situation of ICMI just before the creation of *Educational Studies in Mathematics* (Commission..., 1967). The points approached in the meeting are summarized below:

- Information on the conference of Lausanne sponsored by UNESCO in January 1967 (see below the first volume of *Educational Studies in Mathematics*).
- A. Revuz announced the publication of the first volume of *New Trends*, the series published by UNESCO with the collaboration of ICMI. The following editorial board was proposed: A. Revuz (president), A. Z. Krygowska, H. G. Steiner, D. H. Wheeler, J. Suranyi, M. Glaymann, H. G. Fehr.
- Announcements of:
 - A 12-day conference in October 1968 in Bucharest (Rumania) sponsored by Rumania and UNESCO. About 30 participants were expected.
 - A conference on the integration of the various sciences at secondary level continuing the conference of Lausanne organized by CIES (the commission for integration of sciences in teaching). CIES was discussing with UNESCO the publication of a work on the applications of mathematics to sciences.
- Various proposals for the future activities of ICMI coming from the delegates of various nations present at the meeting.
- The President expressed disappointment about the modality of ICMI participation at the quadrennial Congresses of Mathematicians, which was confined to the presentation of reports. Generally, the national reports were unusable. The President supported the idea of a congress of ICMI to be held a year before the ICM, where invited talks and personal communications could be presented. The assembly accepted the project of a Congress of ICMI in 1969. The French delegate M. Glaymann proposed to hold the congress in France.
- The creation of a center of documentation of ICMI. According to Steiner such a center was already active in Southern Illinois University and he himself was co-director for Europe.
- A. Revuz asked for a new journal closer to secondary teachers, because *L'Enseignement Mathématique* has at too high a level. There were different proposals and at the end the assembly decided the creation of a commission for studying this question. "Behnke, Châtelet, Hilton, Novak, Pescarini, Steiner, Thwaites ainsi que M. and Freudenthal" were appointed as members (p. 245).
- It is proposed to restrict the treatment of school organization and the programs to the meeting and conferences of ICMI. For the next meeting of Bucharest the themes proposed were the following: mathematization, motivation, how to teach mathematics without the teacher, comparative evaluation of the contents of mathematical courses, issues fostering the success, evaluation of the results of research of mathematics education, methodology of research.
- Contact with developing countries
- Proposals for reviving the national commissions (increasing the number of members at large, creation of a permanent secretariat).

The Foundation of a New Journal, The new tradition of ICME Conferences

As president of ICMI (1967-1970) Freudenthal took two important initiatives aimed at raising the profile of ICMI. Firstly, since he did not see *L'Enseignement Mathématique* as meeting the needs of the day, in 1968 founded *Educational Studies in Mathematics*¹¹, as a publication independent from ICMI. Obviously, this action provoked a friction with IMU. Lehto (1998, p. 259) reports that

¹¹ The timeline of the foundation of *ESM* is in Appendix 1.

At the meeting of the IMU Executive Committee held in Paris in May 1968, President [H.] Cartan and Secretary [O.] Frostman complained of the lack of information about the activities of ICMI. [...] The Executive Committee had not been told of the creation by ICMI of the new journal *Educational Studies in Mathematics*, which seemed to compete with *L'Enseignement Mathématique*. A financial contract had been signed between ICMI and UNESCO without the IMU having been informed.

The second initiative taken by Freudenthal was the creation of ICME Congresses, a permanent institution which after the second ICME in 1972 was arranged regularly every four years between, see Appendix 2. With this initiative Freudenthal recovered the tradition, established in the first years of ICMI before the First World War, of having international congresses detached from the ICMI. The first ICME was held in Lyon (France), during 24-30 August 1969, thanks to financial subventions from the French government and UNESCO. The initiative was received by IMU with coldness, as evidenced by the sentence “it seems that ICMI decided to hold an international congress in Paris in 1969” reported in (Lehto, 1998, p. 259) from the *ICMI-Bulletin of the International Commission on Mathematical Instruction* (January 1984, n. 15, pp. 17-20).

Both the initiatives (*Educational Studies in Mathematics* and ICME) were shocking events in the life of ICMI and of *L'Enseignement Mathématique*. There is no mention of ICMI and of the new journal in the volume 14 (1968, s. 2, 14)¹². The entire issue of 1969 (no number series indicated, 15) is dedicated to J. Karamata (1902-1967), without notes on ICMI or on the Lyon conference. We may note that, in spite of these events that could have been appeared as a tear with the past, in his address at ICME-1 Freudenthal (1969-1970) acknowledged the scope without borders of ICMI's activities since the beginning of the century.

The first volume (1968-1969) of *Educational Studies in Mathematics*¹³ does not contain an editorial statement. However in his address Freudenthal (1968-1969, p. 3) provides a list of propositions on the teaching of mathematics referring to the resolutions¹⁴ adopted in the meeting of Lausanne (January 1967) sponsored by UNESCO, which was attend also by physicists. These resolutions are published in this first volume (pp. 244-246), together with recommendations about the coordination of the teaching of mathematics and physics. The eight points of the resolutions concern:

- the right of all children to be educated through mathematics, a unique and characteristic activity of the human mind.
- the development of the capacity of intellectual action instead of merely piling up of knowledge
- the knowledge and the mastership of mathematical structures and its utilization in the grasp of reality as objectives of mathematics teaching
- the attempt to use these structure from childhood on
- the acquisition of some more sophisticated structures until the end of secondary school
- the training of teachers
- the re-training of teachers in relation with the permanent process of reformation of mathematics teaching. The retraining has to be based on regular pedagogical research
- the global collaboration in this field and the “urgent requirement to establish an international organism for information on the teaching of mathematics” (p. 244)¹⁵.

¹² In the volumes of 1968 and 1970 the year of the volume is different from the year of the publication.

¹³ For the publisher and the editorial board of the volume 1 see Appendix 3.

¹⁴ “In my opinion the resolutions adopted in Lausanne are a mile-stone in the philosophy of mathematical education. If I substitute my wishes and hopes for my opinion, I would say they should be so” (Freudenthal, 1968-1969, p. 3).

¹⁵ These words are reported literally from the text of the resolutions and show some mistrust in the effectiveness of ICMI's action.

A synthesis of some important Freudenthal's ideas comes from the title of the Colloquium held in Utrecht, 26 of August 1967: 'How to teach mathematics so as to be useful'. This colloquium was "an activity of ICMI sponsored by the government of the Netherlands and by IMU". The Proceedings are published in the first volume of *Educational Studies in Mathematics* (pp. 1-243).

The authors in the first volume were members of the editorial board or eminent chief characters in the world of education of that period. The languages used were English, French, and German. We remark the concern for the relation of mathematics with other disciplines and the presence of two papers (by M. Glaymann and by R. J. Walker) on the use of computers.

In the counter-cover there is the announcement of the first ICME to be held in Lyon. The second volume contains the addresses and the resolutions (in English and French) of the Congress (1969-1970, pp. 135-418). Thus the proceedings of ICMI-1 were published in two forms: as a book and as a part of the volume 2 of the journal. The Editorial Board of *Educational Studies in Mathematics* is the editor of the proceedings. In the allocution to the Congress Freudenthal (1969-1970) alternates English and French language.

The Editorial Board (with the only exception of W. T. Martin who was absent from volume 7 onwards) remained unchanged until volume 9 (1978). The new editor A. Bishop constituted "a new Board, independent from the old one"¹⁶ in charge from volume 10 of 1979. Since the foundation of the journal to this year many events important for mathematics educators community had taken place. In 1977 the first conference of IGPME (International Group for the Psychology of Mathematical Education) took place in Utrecht (29 August-2 September). Freudenthal, who had joined the Group in Karlsruhe (ICME-3) accepted to deliver the welcome address, though claiming that "I could hardly define in which way I am interested in psychology" (1978a, p. 1). The volume 9 of *Educational Studies in Mathematics* hosts the texts of talks delivered in this conference. At pages 141-142 of this volume we find the announcement of the approval by ICMI Executive Committee of the affiliation of the "International Study Group on Relations Between the History and Pedagogy of Mathematics, cooperating with the International commission on Mathematical Instruction" (p. 141).

In volume 9 of *Educational Studies in Mathematics* Freudenthal published a special issue (two numbers, pp. 147-379) containing the national reports on the theme 'Changes in mathematical education since the late 1950's – ideas and realisation. An ICMI report'. In the rich variety of approaches, Freudenthal (1978b, p. 145) identified the following "common lesson learned by all concerned in the process of innovations [...]: better understanding of the part played by the teacher in the course of change".

In the 'Tribute' published in volume 9 (1978, p. 504) the retiring Editorial Board acknowledged that "ESM have neither started nor blossomed had it not been for his [Freudenthal's] initiative, imagination, enthusiasm and energy".

Epilogue

The intertwining of the scope of IMU, ICMI, *Educational Studies in Mathematics*, *L'Enseignement Mathématique* had as a central question the relationship between mathematicians and mathematics educators. The tear provoked by the foundation of *ESM* had the merit of fostering a clarification of the domains of actions of these two communities.

¹⁶ (Freudenthal, 1978c, p. 504).

L'Enseignement Mathématique pursued a different direction in respect to *Educational Studies in Mathematics*: it became a journal publishing works on pure mathematics, while continuing to be the official organ of ICMI. In 1983 (s. 2, 29) the ICMI President J. P. Kahane and the ICMI secretary G. Howson joined the editorial board of *L'Enseignement Mathématique*, which then started publishing discussion documents for the newly-instituted ICMI Studies in its pages¹⁷. Then old links were renewed and strengthened.

In the allocution at a first ICME Freudenthal (1969-1970, p. 136) claimed that “Mathematics should not be taught to fit a minority, but to everybody, and they should learn, not only mathematics but also what to do with mathematics”. Which better way to revive and update the old ideals expressed in the first issue of *L'Enseignement Mathématique* in the light of the new world view promoted by the flower children’s revolution in the 1960s?

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¹⁷ The first discussion document ('The influence of computers and informatics on mathematics and its teaching') was prepared by R. F. Churchhouse, B. Cornu, A. P. Ershov, A. G. Howson, J. P. Kahane, J. H. van Lint, F. Pluvinaige, A. Ralston, M. Yamaguti. It is published in *L'Enseignement Mathématique* (1984), s. 2, 30, 161-172.

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Appendix 1: Timeline of the foundation of *Educational Studies in Mathematics*¹⁸

- Final session of the ICMI Colloquium on Modern Curricula in Secondary Mathematical Education, held 19-22 December 1964 at the Mathematical Institute of Utrecht State University. The following resolution was adopted (p. 503):

The participants in the Utrecht Colloquium on Modern Curricula in Secondary Education feel the urgent need for more international information on national activities in mathematical education, which could be organized and spread by an active and accessible international center of information or by a high level periodical on mathematical education.

The proceedings were not published. It was necessary to create suitable conditions so that this fact will not happen also at the Utrecht Colloquium in 1967.

- The beginning passage of the circular of 13 April 1965 to people active in mathematical education (p. 503):

In order to carry out a resolution adopted at a Colloquium on Modern Curricula in Secondary Education, held at Utrecht in December 1964, I have taken steps to arrive at publishing a high level international periodical on mathematical education. The publishers Reidel at Dordrecht (Netherlands) appear to be favourably inclined towards such a project. (p. 502)

¹⁸ From (Freudenthal, 1978c).

- 21-25 August 1967: Utrecht Colloquium. Freudenthal sought and found Reidel's helpful cooperation before the actual constitution of the Editorial Board of *ESM*. The proceeding will be published in the first volume of *ESM*. Freudenthal (p. 503) writes "In this phase I experienced valuable help from Peter Hilton who advised me about the constitution of the Board of Editors and who gave the journal its present name *Educational Studies in Mathematics*."
- 2 December 1967: Letter of invitation to people to become members of the Editorial Board.
- May 1968: date of the first issue of *ESM* (numbers 1/2).

Appendix 2: Proceedings of the conferences ICME

ICME-1, Lyon (France), 24-30 August 1969

The Editorial Board of Educational Studies in Mathematics (Eds.) (1969). *Actes du premier Congrès International de l'Enseignement Mathématique (Commission Internationale de l'Enseignement Mathématique, CIEM)/ Proceedings of the first International Congress on Mathematical Education (International Commission on Mathematical Education (sic), ICMI)*. Dordrecht: D. Reidel. One volume: 286 pages.

Also published in *Educational Studies in Mathematics*. (1969-1970), 2(2/3), 135-418.

ICME-2, Exeter (UK), 29 August-2 September 1972

Howson, A. G. (Ed.) (1973). *Developments in Mathematical Education. Proceedings of the Second International Congress on Mathematical Education*. Cambridge: Cambridge University Press. One volume: IX + 318 pages.

ICME-3, Karlsruhe (Germany), 16-21 August 1976

Athen, H. & Kunle, H. (Eds.) (1977). *Proceedings of the Third International Congress on Mathematical Education*. Karlsruhe: *Zentralblatt für Didaktik der Mathematik*. One volume: 400 pages

The outcome of the thirteen "sections" of the Congress was collected in a book published by UNESCO (1979). *New trends in mathematics teaching*, Vol. IV. Prepared by the International Commission on Mathematical Instruction.

ICME-4, Berkeley (USA), 10-16 August 1980

Zweng, M., Green, T., Kilpatrick, J., Pollak, H. & Suydam, M. (Eds.) (1983). *Proceedings of the Fourth International Congress on Mathematical Education*. Boston: Birkhäuser. One volume: 725 pages.

ICME-5, Adelaide (Australia), 24 -30 August 1984

Carss, M. (Ed.) (1986). *Proceedings of the Fifth International Congress on Mathematical Education*. Boston - Basel - Stuttgart: Birkhäuser. One volume: 401 pages.

ICME-6, Budapest (Hungary), 27 July-3 August 1988

Hirst, A. & Hirst, K. (Eds.) (1988). *Proceedings of the Sixth International Congress on Mathematical Education*. Budapest: János Bolyai Mathematical Society. One volume: 397 pages.

ICME-7, Quebec (Canada), 17-23 August 1992

Gaulin, C., Hodgson, B. R., Wheeler, D. H. & Egsgard, J. (Eds.) (1994). *Proceedings of the 7th International Congress on Mathematical Education*. Québec: Les Presses de l'Université Laval. One volume: 495 pages.

Robitaille, D., Wheeler, D. H. & Kieran, C. (Eds.) (1994). *Selected Lectures from the 7th International Congress on Mathematical Education*. Québec: Les Presses de l'Université Laval. One volume: 370 pages.

ICME-8, Seville (Spain), 14-21 July 1996

Alsina, C., Alvarez, J. M., Niss, M., Pérez, A., Rico, L. & Sfard, A. (Eds.) (1998). *Proceedings of the 8th International Congress on Mathematical Education*. Seville: SAEM Thales. One volume: 539 pages.

Alsina, C., Alvarez, J. M., Hodgson, B., Laborde, C. Pérez, A. (Eds.) (1998). *8th International Congress on Mathematical Education - Selected Lectures*. Seville: SAEM Thales. One volume: 485 pages.

ICME-9 Tokyo-Makuhari (Japan), 31 July-6 August 2000

Fujita, H., Hashimoto, Y., Hodgson, B. R., Lee, P. Y., Lerman, S. & Sawada, T. (Eds.) (2004). *Proceedings of the Ninth International Congress on Mathematical Education*. Norwell, MA; Dordrecht: Kluwer Academic Publishers, One volume: 430 pages.

ICME-10 Copenhagen (Denmark), 4-11 July 2004

Proceedings to appear.

Appendix 3: Editorial board of *Educational Studies in Mathematics*, 1 (1/2), May 1968-1969

Editor: H. Freudenthal, Mathematical institute, University of Utrecht, The Netherlands

Editorial Board:

D. K. Abbiw-Jackson, Kumasi, Ghana

E. G. Begle, Stanford University, CA, USA

Mlle E. Castelnuovo, Rome, Italy

G. Choquet, Paris, France

A. Engel, Stuttgart, [West] Germany

Mme L. Félix, Paris, France

H. B. Griffiths, Southampton, England

P. Hilton, New York, NY, USA

C. Hope, Worcester, England

Mme A. Z. Krygowska, Cracow, Poland

W. T. Martin, Cambridge, MA, USA

O. Pollak, Murray Hill, NJ, USA

A. Revuz, Paris, France

W. Servais, Morlanwelz, Belgium

S. Sobolev, Novosibirsk, USSR

H. G. Steiner, Karlsruhe, Germany

P. Suppes, Stanford University, CA, USA

B. Thwaites, London, England.

Publisher: D. Reidel Publishing company, Dordrecht (Holland)

