

## INTRODUCTION

Organized jointly by the University of Geneva and the International Commission on Mathematical Instruction, a symposium on mathematics education was held in Geneva in October 2000 under the theme

“ONE HUNDRED YEARS OF *L'ENSEIGNEMENT MATHÉMATIQUE* :  
MOMENTS OF MATHEMATICS EDUCATION IN THE 20<sup>TH</sup> CENTURY”

It was an occasion for celebrating the 100<sup>th</sup> anniversary of the international journal *L'Enseignement Mathématique*, founded in 1899 by Henri Fehr (Geneva) and Charles-Ange Laisant (Paris). Among periodicals devoted to mathematics education, the new journal was the first to seek explicitly an international audience; in fact, an original characteristic of the beginnings was a series of articles on the teaching of mathematics in different countries.

The fact that such a journal was launched in Geneva is not surprising if we consider the local context in which it emerged. Apart from obvious references to internationalism as seen from Henry Dunant's birth-place, it is also true that, for centuries, Geneva had been haunted by the myth of its pedagogic vocation.

To describe this strong historical background, it is useful to recall here that the city of Geneva was not a part of the Swiss Confederation until 1815. It had been an episcopal principality for several hundred years — with a relatively large degree of autonomy granted to the people — until it became an independent protestant republic, by a decree of 21<sup>st</sup> May 1536, in which the *Conseil général* promulgated the Reformation<sup>1</sup>). It is quite remarkable that the same decree set the principle of compulsory education, which was also declared free for the poor :

[...] que chescung soit tenu envoyer ses enfans à l'escholle et les faire apprendre.<sup>2</sup>) [Encyclopédie de Genève 1986, 127]

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<sup>1</sup>) To avoid a common confusion, it is important to note that this decision was reached under the determining influence of Guillaume Farel, a few months *before* Jean Calvin arrived in Geneva.

<sup>2</sup>) [...] that everyone be required to send their children to school and have them learn.

In 1559 Jean Calvin inaugurated two new institutions: the *Collège* (with seven grades) and the *Académie*. Led by Mathurin Cordier, Théodore de Bèze, and others, both schools attracted numerous students from France, the German States, the Low Countries and the whole of Europe, right from the beginning<sup>3)</sup> but even more after the Saint-Barthélemy massacre (1572).

Mathematics and physics were also taught. However, a formal chair of mathematics was introduced in the *Académie* only in 1724, with Jean-Louis Calandrini and Gabriel Cramer as professors.

In spite of these auspicious beginnings, many questions were raised throughout the 18<sup>th</sup> century about the quality, the content and the methods of instruction. The best known name in this connection is that of Jean-Jacques Rousseau, who was concerned with pedagogy<sup>4)</sup>. But the discussion, which involved famous scientists like Horace-Bénédict de Saussure, went on more specifically about the respective roles of the sciences and the humanities<sup>5)</sup>, or the creation of technical schools.

At the beginning of the 19<sup>th</sup> century, many educators were active on this fertile soil. One was Rodolphe Töpffer, a professor of Greek and rhetoric in Geneva's *Académie* who created his own pedagogic system and even opened a boarding school. He is also viewed by some as the inventor of the comic strip.

The cartoons selected here<sup>6)</sup> illustrate, with a specific hint at mathematics, the kind of animated debate that was going on about the organization of primary and secondary schools (public or private) at that time. They are drawn from *Monsieur Crépin* [Töpffer 1837, 11–12], a comic strip published in Geneva in 1837. They depict a father who is trying to find a suitable preceptor for his children. In the preceding cartoon one of the first teachers he has hired explains that “all pupils now begin to proceed very well from the general to the particular”. An example is provided by the cartoon about Besançon. The father is of course rather unhappy, even though the answer is mathematically correct. The next cartoon shows how the system can fail if the pupil is not particularly gifted. Considering the early date (1837), any allusion to Bourbaki and the ‘new maths’ movement in the third cartoon would be sheer anachronism. But the questions were already very clearly stated.

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<sup>3)</sup> John Knox, Jean de Léry, and other distinguished names, were among them.

<sup>4)</sup> *Émile, ou de l'éducation* was published in the Hague and Paris in 1762, ... and burnt in Geneva in that same year!

<sup>5)</sup> Saussure published a *Projet de réforme pour le Collège* in 1774; cf. [Encyclopédie de Genève 1988, 13–14].

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The teacher summons Joseph and asks him: "Where is Besançon?"

Joseph instantly replies that Besançon is in the set of all things, which includes the Universe, which includes the World, which includes all four parts of the World, which include Europe, where Besançon lies.

Having called Leopold, Mr. Crépin himself asks how much will eight pounds of lard cost, at five florins a pound. Leopold instantly replies that lard is in the set of all things, which includes the Universe, which includes all three reigns, which include the animal reign, which includes the pig, which includes lard.

Mr. Crépin finds that his son Leopold is little advanced in Arithmetic. The teacher explains that, in his system, Arithmetic is the very last thing that Leopold will know. Indeed, he must first know Algebra, which he will begin to learn only after an in-depth study of quantity in general.

The *Académie* was itself undergoing a process of transformation which was giving it a status more in line with that of other universities in Europe<sup>7)</sup>. Since Fehr began his studies and completed his doctorate in Geneva, he was certainly aware of these discussions. In connection with Furinghetti's article in this monograph, we can also mention that, as a professor in the University, he had Théodore Flournoy and Édouard Claparède as colleagues.

The first prefaces of *L'Enseignement Mathématique* show that Fehr and Laisant also wanted to associate the world of teaching to the "great movement of scientific solidarity" which was emerging at the end of the 19<sup>th</sup> century,

<sup>7)</sup> The *Académie* evolved into the University of Geneva in 1872, with a Faculty of Medicine, independence from the clergy, etc.

notably through the organization of international meetings such as the first International Congress of Mathematicians held in Zurich in 1897. The journal immediately obtained important successes, as is testified by the gold medal at the World Fair of Brussels in 1905.

The idea of internationalism in mathematics education was crucial to the journal right from its beginning and it even led to some articles in or about Esperanto. Moreover the frequent advocacy in the journal of the importance of an international perspective played an essential role in the establishment, a few years later, of the International Commission on Mathematical Instruction.

The two editors Fehr and Laisant had proposed in 1905 to organize an international survey on the reforms needed in mathematics education, asking in particular for opinions on the following theme: “les conditions que doit remplir un enseignement complet, théorique et pratique, des mathématiques dans les établissements supérieurs”<sup>8)</sup> [La Rédaction 1905, 382].

In response to a question on the progress needed in the organization of the teaching of pure mathematics, the US mathematician and teacher educator, David Eugene Smith, explicitly suggested the establishment of an international commission to study the situation:

Pour ce qui est de la première question, j’estime que la meilleure manière de renforcer l’organisation de l’enseignement des mathématiques pures, serait de créer une commission qui serait nommée par un Congrès international et qui étudierait le problème dans son ensemble.<sup>9)</sup> [Smith 1905, 469]

Smith repeated this suggestion in a report he presented at the Fourth International Congress of Mathematicians, held in Rome in April 1908. This Congress then adopted a resolution<sup>10)</sup> to the effect of appointing a committee, composed of Felix Klein (Germany) as President, George Greenhill (Great Britain) as Vice-President, and Henri Fehr (Switzerland) as Secretary-General, with the mandate to constitute an International Commission to organize a comparative Study on the methods and plans of mathematics teaching in secondary schools. This International Commission eventually developed a much wider scope of interest and became the ICMI as we know it today.

The coincidence of the spirit of internationalism between the newly established Commission on teaching and the journal *L’Enseignement Mathé-*

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<sup>8)</sup> The conditions to be satisfied by a complete — theoretical and practical — teaching of mathematics in higher institutions.

<sup>9)</sup> As regards the first question, I consider that the best way to reinforce the organization of the teaching of pure mathematics, would be the establishment of a committee appointed by an international Congress and which would study the problem in its entirety.

<sup>10)</sup> See in this connection *L’Enseign. Math.* 21 (1920), 306.

*matique*, possibly combined with the presence of Fehr being active in both groups, resulted in one of the very first decisions of ICMI being to select the journal as its official organ. This was announced simply as follows in the journal as part of a report on the decision of the Rome Congress to establish an International Commission: “*L’Enseignement mathématique* servira d’organe à la Commission, dont la tâche se rattache très intimement à celle que poursuit notre revue internationale depuis dix ans.”<sup>11)</sup> [Chronique 1908, 333]

The explicit mention of the journal as the official organ of ICMI can be seen on the front cover of the first issue following the inception of the Commission (volume 11, 1909). And it has been appearing on the cover ever since then, except for some periods when ICMI was inactive around the Second World War.

Another distinguishing feature of *L’Enseignement Mathématique* at the outset was a keen interest of the journal in the social role of mathematics and of science in general. Laisant in particular was the author of several articles on these topics. To give an idea of his fairly optimistic vision, we may quote: “Si la science pouvait devenir exclusivement utilitaire, elle perdrait sa plus grande utilité.”<sup>12)</sup> [Laisant 1904, 342], and also: “Mesurer une science à son utilité est presque un crime intellectuel.”<sup>13)</sup> [Laisant 1907, 121].

The aim of the symposium organized by the University of Geneva and ICMI was to look at the evolution of mathematics education over the twentieth century and to identify some guidelines and trends for the future, taking into account, among other sources, the documents, debates and related papers having appeared in *L’Enseignement Mathématique*. The emphasis was on secondary education (students in the age range of about 12 to 18 or 19 years) and also included the education of teachers.

The programme of the symposium was based on a series of invited talks. The Programme Committee<sup>14)</sup> had identified three main themes to be discussed — geometry, analysis, and applications of mathematics — and three different periods at which these themes were to be considered: 1900, 1950 (*i.e.* the period leading to the ‘new maths’), and 2000.

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<sup>11)</sup> *L’Enseignement Mathématique* will serve as organ of the Commission, whose task is very intimately linked to the aim our international journal has been pursuing for ten years.

<sup>12)</sup> If science could become exclusively utilitarian, it would lose its greatest usefulness.

<sup>13)</sup> Measuring a branch of science by its usefulness is something like an intellectual crime.

<sup>14)</sup> The members of the Programme Committee of the Symposium were Daniel Coray (Switzerland), Fulvia Furinghetti (Italy), Hélène Gispert (France), Bernard R. Hodgson (Canada) and Gert Schubring (Germany).

It was also a gathering of some of the main actors, during the last decades, in mathematics education as considered from an international perspective, and ample time was devoted during the symposium to collective discussions on the themes presented in the talks. In this connection some participants had been invited to play the role of ‘reactors’. They had the responsibility, in each session, of launching the discussion following the invited talks, partly by giving a synthesis of the presentations but more importantly by outlining the major trends and issues about the theme, both in the light of the past century and as seen from today’s perspective.

This explains the subdivision adopted in this book. We must add that every contribution, in either English or French, is preceded by a fairly long abstract in the other language.

We hope these *Proceedings* will contribute to a better understanding and appreciation, among the communities of mathematicians and mathematics educators, of the evolution of mathematics education during the 20<sup>th</sup> century. The book that we are proposing to the reader aims at reflecting the spirit and the work of a symposium which, in the words of Geoffrey Howson, demonstrated

how over the century the emphasis shifted from discussions of the mathematics to be taught to an élite, to the needs of a wider range of students and of society. [...]

It reminded us of the way in which two generations had tried to make enormous changes in the content of school mathematics and methods of teaching it. It gave us an opportunity to see where these earlier efforts had not been wholly successful and challenged us to determine why. With such an understanding we should be better equipped to tackle both the problems that now face us and those which will arise in the future. [Howson 2001, 183]

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Daniel Coray  
University of Geneva (Switzerland)  
*President of the Foundation*  
*“L’Enseignement Mathématique”*

Bernard R. Hodgson  
Université Laval (Québec, Canada)  
*Secretary-General of ICMI*

## REFERENCES

- CHRONIQUE. Commission internationale de l'enseignement mathématique. *L'Enseign. Math.* 10 (1908), 333.
- ENCYCLOPÉDIE DE GENÈVE. *Tome 5 (Les religions)*. Association de l'Encyclopédie de Genève, Genève, 1986.
- *Tome 6 (La science et l'école)*. Association de l'Encyclopédie de Genève, Genève, 1988.
- HOWSON, G. A. A report on the International Symposium organised jointly by the University of Geneva and ICMI. *L'Enseign. Math.* (2) 47 (2001), 181–183.
- LAISANT, C.-A. Le rôle social de la science. *L'Enseign. Math.* 6 (1904), 337–362.
- *La Mathématique, philosophie, enseignement*. (2<sup>e</sup> éd.) Gauthier-Villars, Paris, 1907.
- LA RÉDACTION. Note de la Rédaction sur les réformes à accomplir dans l'enseignement des mathématiques. *L'Enseign. Math.* 7 (1905), 382–383.
- SMITH, D. E. Opinion de David-Eugene Smith sur les réformes à accomplir dans l'enseignement des mathématiques. *L'Enseign. Math.* 7 (1905), 469–471.
- TÖPFFER, R. *Monsieur Crépin*. Genève, 1837. Reprinted in: R. Töpffer, *Monsieur Crépin, Monsieur Pencil: Deux égarements de la science*. Éditions du Seuil, Paris, 1996.