



Twenty five years: looking back and ahead

Pavel Exner

with the gratitude to all who serve the European mathematical community

A talk at the occasion of the jubilee meeting in the **Institut Henri Poincaré**
Paris, October 22, 2015

What has brought us here?



We all know, of course, but it will make no harm to put our present gathering into a proper context, if not for other reason than because the roots of the *European Mathematical Society* the anniversary of which we are celebrating today reach far into the history.

Mathematics flourish in Europe for more than two millenia. In fact, with all due respect to other continents, the main body of the science we call mathematics today was formed in Europe.

If this claim needs a proof, it enough to start listing names, for instance, those of *Pythagoras, Euclides, Archimedes, Diophantus, Fibonacci, Descartes, Newton, Leibnitz, Fermat, Pascal, Euler, Laplace, Lagrange, Gauss, Abel, Galois, Hamilton, Riemann, Klein, Poincaré, Hilbert*, and each of you can keep on reciting scores of others.



Exchange of ideas is the soil on which the science grows. Academies in which scientists join have a long tradition which can be traced back to the ancient Greece. In Europe they started flourishing again since the Renaissance period.

As the numbers of working mathematicians grew they began to organize societies with a purely or dominantly mathematical focus. Among the early ones, one can mention

- **Amsterdam's Koninklijk Wiskundig Genootschap** 1778
- **Union of Czech Mathematicians and Physicists** 1862
- **Moscow Mathematical Society** 1864
- **London Mathematical Society** 1865
- then the gate opened and many other followed

During the twentieth century almost all European countries had mathematical societies, and some had two, three, or even more.

Coming together



The growing sense of European identity inspired efforts to create a society representing all European mathematicians. The original impetus came in 1976 from the European Science Foundation and led to establishing, at the ICM in Helsinki in 1978, of the *European Mathematical Council* lead by Michael Atiyah.



The 'zeroth president' of the EMS

Pains of child bearing



However, one should never expect fast solutions when mathematicians decide to solve a problem, to say nothing of the fact that the general situation on the European scene in the eighties was far from simple.

The next meeting at the ICM in Warsaw was delayed from the well known political reasons, and it was followed by meetings in Prague (1986) and Oberwolfach (1988) trying to draft the prospective society statutes.

After the big political change the feeling of urgency grew stronger and led finally to the decisive meeting in the Polish town of Maðdralin where representatives 28 societies met in October 1990.

Who was at the EMS cradle



The Mađralin meeting, October 27, 1990

What was agreed in Mađralin



As we all know, two different concepts competed. Most participants wanted a federation of national societies, while the French advocated a society with individual membership.

Complicated negotiations led to a compromise by which the European Mathematical Society has a combined architecture having both *individual* and *corporate members*, the later being mostly national mathematical societies but also research institutes and other bodies.

In a sense, the EMS is thus *a new building made of old bricks*

The Mađralin meeting approved the Statutes by which the society is governed by the *Council* elected by all the members, meeting every two years, while the day-to-day work is steered by the *Executive Committee*.

The meeting also elected *Fritz Hirzebruch* the first EMS president, he was followed by an array of prominent mathematicians.

Who was at the EMS helm



Friedrich Hirzebruch (1990-1994)



Jean-Pierre Bourguignon (1995-1998)



Rolf Jeltsch (1999-2002)



John Kingman (2003-2006)



Ari Laptev (2007-2010)



Marta Sanz-Sole (2011-2014)

Where we are now



On the way from the modest origin in Mādralin a lot was achieved in the quarter a century that passed.

It is not my aim here, however, to describe the EMS evolution from its birth, rather I want to present the society history from the point of view its present state, as well as from the challenges that lie ahead.

I recall that an interested reader can follow the EMS growth step by step using various sources as, for instance

- about David Wallace's account of *the first EMS decade* available at the EMS webpage
- Rolf Jeltsch and John Kingman wrote nice *accounts of their presidencies* for the last issue of the EMS Newsletter covering the period 1999–2006
- the same Newsletter issue brings recollections of the *first three EMS congresses* written by people involved in their preparation
- and various other sources

What we thus have at the 25th birthday



In a brief summary, the EMS at the present moment represents

- about *60 member societies* (55 full members, two associate, three reciprocal, one new application), up to 28 at the beginning, and *2459 individual members* (recall that at 3000 we are bound to reconsider the society architecture)
- *26 mathematical research centers*, more than any other continent, and 15 other institutional members such mathematics departments and other scientific organizations
- 11 permanent *committees* dealing with various aspects of mathematician's life
- quadrennial *congresses* interlacing with the ICM
- coveted *EMS prizes* regarded as a staple of quality
- journal and books coming from our *publishing house*

as well as numerous other activities of which more later.



To have a **European Congress of Mathematics** every four years was one of the first decisions. They typically attract around one thousand people. So far we had them in

- **1 ECM:** Paris, July 6-10, 1992
- **2 ECM:** Budapest, July 22-26, 1996
- **3 ECM:** Barcelona, July 10-14, 2000
- **4 ECM:** Stockholm, June 27 - July 2, 2004
- **5 ECM:** Amsterdam, July 14-18, 2008
- **6 ECM:** Krakow, July 2-7, 2012

The forthcoming 7th congress convenes at **TU Berlin** on July 18-22, 2016, cf. <http://www.7ecm.de/>. We await it with great expectations.

For the congress in 2020 bids have been obtained from universities of **Sevilla** (Spain) and **Primorska** (Slovenia). The decision will be taken at the council prior to the 7ecm.

Prizes and the one-in-six rule



The renown of the *EMS Prizes* is seen from the fact that of the 60 laureates so far ten received subsequently the Fields medal:

- Richard Borcheres 1992/1998
- Maxim Kontsevich 1992/1998
- Tim Gowers 1996/1998
- Grigory Perelman 1996/2006 (declined)
- Wendelin Werner 2000/2006
- Andrei Okounkov 2004/2006
- Elon Lindenstrauss 2004/2010
- Stanislav Smirnov 2004/2010
- Cédric Villani 2008/2010
- Artur Avila 2008/2014

We also have brothers Lafforgue (one has the EMS Prize, one Fields) and combinations with other prestigious prizes. Hopefully, to be followed.

The EMS also awards *Felix Klein Prize* for the exceptional research in the area of applied mathematics and *Otto Neugebauer Prize* for the highly original and influential work in the field of history of mathematics.

EMS Committees



As I said, they cover most aspects of mathematicians life:

- *Applied Mathematics*: one of the most active reflecting the vital importance of mathematics in many fields of life and science. At the same time, we strongly believe in the unity of mathematics, and want pure and applied mathematicians to keep talking to each other under a single roof.
- *Developing Countries*: in collaboration with the corresponding IMU commission, CIMPA, and others this committee goal is to help in various ways to mathematicians in less fortunate countries. We only wish to have more money available to this noble goal.
- *Education*: no need to stress how important is the mathematical education for the future of our discipline, and at the same time, that it is not always simple to find a common language between mathematics teachers and researchers.
- *Electronic Publishing*: these ways of communicating mathematical results are steadily gaining importance, both concerning the new literature and turning older results digital, of which more in a while.



A particular committee, in charge of *European Research Centres in the Mathematical Sciences*. Europe has probably the densest network of such centres. They are very different; some have a significant permanent staff, some are 'conference factories' but they all keep very high scientific level. (Brian Davis: *"... a mathematician's version of paradise"*). Some of them:

- Stefan Banach International Mathematical Center
- Centre International de Rencontres Mathématiques (CIRM)
- Erwin Schrödinger International Institute for Mathematical Physics
- Euler International Mathematical Institute
- The Abdus Salam International Centre for Theoretical Physics (ICTP)
- Institut des Hautes Études Scientifiques (IHES)
- Institut Mittag-Leffler
- Isaac Newton Institute for Mathematical Sciences
- and eighteen others



- *Ethics*: a relatively young committee dealing with issues of ever growing importance. They formulated the *Code of Practice* which we recommend our journals to follow.
- *European Solidarity*: a quarter of century after the European divide was removed, some huge differences persists, and we are committed to help especially young mathematicians suffering difficulties.
- *Meetings*: the task of this committee is to make recommendation on conferences, schools and other activities to be supported.
- *Publications*: the committee deals with various general publication issues, lately for example those concerning *open access* problems.
- *Raising Public Awareness*: there is no doubt that perception of mathematics among general population is not exactly optimal and it is in our vital interest to do everything to improve this situation.

Women in mathematics



We are well aware that the boundary conditions for men and women careers in mathematics are not the same and we are firmly committed to work against any biases, in particular, through our active *Women in mathematics* committee.

Important to say, women often played vital roles throughout the EMS history. I cannot mention all of them, let just recall a pair of names of particular significance.

The first belongs to the lady who for about fifteen years was the soul and memory of the society,

Tuulikki Mäkeläinen



Tuulikki Mäkeläinen
soul and memory

Women at helm



The EMS can provide, however, not only examples of participation but also of female leadership:



Marta Sanz-Sole served as the EMS President in the period 2011–2014 and we all have in a fresh memory the way she led the society, strong and diplomatic at the same time

One of the most active members of the applied-math community, *Maria Jesus Esteban*, is since three weeks the President of the *ICIAM*, an important organization of which the EMS is a member. We wish her success in this role!



More EMS women



It is impossible to list all the women who played a significant role in building the EMS. Let me just flash alphabetically a sample of names:

Eva Bayer-Fluckiger, Bodil Branner, Mireille Chaleyat-Maurel, Doina Cioranescu Mireille Martin-Deschamps, Olga Gil-Medrano, Frances Kirwan, Sheung Tsun Tsou, Nina Uraltseva, and many others

And I should not forget three more names:



A member of the current EC, *Laurence Halpern*, who did most work in preparing this meeting in IHP and deserve applause

And the two young ladies, *Elvira Hyvönen* and *Erika Runolinna*, who run presently our secretariat in Helsinki



Further activities



Congresses and committee work are by far not all what the EMS does. We support many sorts of mathematical activities having, for instance

- *EMS Lecturers*: once a year, the last was *Nicole Tomczak-Jaegerman* at the EWM Conference in Cortona in September
- *EMS Distinguished Speakers*: up to three per year, now *Sylvia Serfaty* at the AMS-EMS-SPM conference in Porto in June
- *EMS Joint Mathematical Weekends*: the ninth issue was organized together with the LMS in September in Birmingham
- *EMS Summer Schools* in pure and applied mathematics
- *Activities with other societies*: Bernoulli Soc.–EMS Joint Lecture, this year by Gunnar Carlsson; joint summer school with IAMP, next one in Rome 2016

cf. <http://www.euro-math-soc.eu/news/13/01/10/call-proposals-scientific-activities-2016>.
The proposals are collected and evaluated by our meetings committee.

Also, at our webpage we run a database of *jobs in mathematics*.



Mathematics literature is particular being, at least in principle, *eternally valid*. Europe is taking lead in making this treasure trove digitally accessible, in particular through <https://eudml.org/>

- Gateway to electronic publications and repositories of data providers
- 12 founding members: EMS, FIZ Karlsruhe, ICMCM Warsaw, Univ. of Grenoble, Czech Academy of Sciences, ... , UMI
- Data, tools and services assembled or created in the EU funded *EuDML project* (2009-2013)
- Contribution to the World Digital Mathematics Library – a WG was created at the ICM in Seoul but the EuDML is for the moment the only functioning component, covering some **6% of the mathematics literature in the world**

Another way in which care about mathematical literature is the *Zentralblatt für Mathematik* which we run together with Springer and FIZ Karlsruhe



And this is not all, here is another recent initiative:

- A network of Mathematics for Industry and Innovation promoted by the EMS and ECMI (European Consortium for Mathematics in Industry), <http://www.eu-maths-in.eu/>
- Members are national networks in industrial mathematics: France, Germany, Austria, Italy, Spain, The Netherlands, UK, Ireland, Hungary, Czech Republic, Poland, Sweden, and Norway
- Service unit for exchanges of mathematical research and exploitation for innovation, industry, science and society
- Bridge between academic research groups and industry, with a European support



At the dawn of the millenium, the EMS started its own publishing house. The main mover was *Rolf Jeltsch*, then the EMS President. The society owes for its successful start to *Thomas Hintermann*, and also to *Manfred Karbe* and others. After fifteen years in existence

- the EMS-PH presently publishes *10-15 books* per year and *19 journals*.
- among the journals we have our 'own', *Journal of the EMS* or shortly *JEMS* which belongs now to those with high reputation.
- the EMS also publishes a *Newsletter* which offers a lot of interesting reading; recall that its electronic version is freely available at <http://www.ems-ph.org/journals/journal.php?jrn=news>
- as the publishing house grows we decided to form recently a *Scientific Advisory Board* headed now by Jakob Yngvason. It is our intention to develop the enterprise further and make it stronger.



The above activity list can be continued, mentioning also that

- we collaborate with the *International Mathematical Union* and mathematical societies and organizations around the world
- we are involved in high mathematical awards such as the *Abel Prize* and in various mathematical committees
- as mentioned, we are a part of *CIMPA*, the organization which helps mathematicians in the developing countries around the world
- we use our influence for *political lobbying* in various European institutions in the interest of mathematics and science in general
- etc., etc.

What this all tells us?



I think you would agree documents that the EMS was not idle in the first quarter of century of its existence and made a significant way from its modest origin in Mądralin.

The purpose of this survey, definitely, is not to be boasting over our achievements. We are well aware that — paraphrasing the words of Isaac Newton — we are standing on the shoulders of giants. It is our constituents, *our corporate and individual members*, from whom the EMS derives its strength, and it is them who deserve our sincere thanks at this jubilee occasion.

At the same time, I hope that the survey I presented managed to convince everybody that the EMS is at its 25th birthday strong and self-confident, well prepared *to face challenges in the years to come*.

What will follow?



Having thought about the programme of this meeting we felt that we should not overdo concerning the account of the history and the current state of the society. We believe that you would rather enjoy

- some interesting mathematics
- a discussion of problems influencing mathematicians lives

For the first we choose four different lectures, all by excellent speakers, describing problems coming from very different parts of mathematics.

Concerning the second, we asked Jean-Pierre Bourguignon to lead a panel discussion on some questions, in particular

- how is mathematics learned and taught
- how it is done, communicated, and published
- how it interacts with the “outer world”
- how it deals with news facts like big data, etc.

To close



The programme will be followed in the evening by
a cocktail at *Mairie de 5e arrondissement*

Having said that, let me thank you for your attention
and wish you to enjoy the programme!