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edited by Bruno Colbois, Christine Riedtmann, and Viktor Schroeder

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This unusual book was published in 2010 by the Swiss Mathematical Society (SMS) to celebrate its 100th anniversary, and a copy was presented to every member. It consists of 23 contributions covering many aspects of a century of mathematics in Switzerland. The authors evoke prominent personalities as well as institutes and institutions—even personal memories and student life find a place. There is great diversity in the contributions: French, German, and English are used, and nearly half of the articles are reprinted from older publications. Authors were encouraged to write what they liked as they liked. Many contributions are full of life, whereas others reflect some academic dryness. Authors also freely chose their illustrations, with the result that many photographs emerged from little-known private albums. Paraphrasing the title of one of the essays, I would describe the volume primarily as a collection of glimpses. It is not (and was not intended to be) an encyclopædia giving a systematic and detailed account of mathematics in Switzerland, but it is an exciting source of information. The steering committee of the SMS, Bruno Colbois, Christine Riedtmann, and Viktor Schroeder, edited the work carefully. The result is an anniversary gift with a special touch.

The first contribution is a memorial essay on the history of mathematics in Switzerland, written by Michel Plancherel on the occasion of the 50th anniversary of the SMS. The second is a history of the SMS commissioned by our centenarian society. The science historian Erwin Neuenschwander has written a well-documented report on the origin and activities of the society during its first hundred years, including a useful chronicle of year-to-year events. The remaining pieces in the volume appear in alphabetic order (based on the authors' names). I will not review the essays individually nor follow their order, but try instead to provide a personal synthesis of the book along a historical thread.

The first countrywide scientific organization in Switzerland was the Swiss Society for Natural Sciences (Schweizerische naturforschende Gesellschaft, SNG), established in 1815 to encourage natural sciences in Switzerland through the organization of annual meetings and the publication of a scientific journal. (Local societies were already in existence.) At the beginning of the twentieth century, specialized scientific societies were organized as subsections of the SNG: the Swiss Chemistry Society in 1901, the Swiss Physics Society in 1908 and, last but not least, the Swiss Mathematical Society (SMS) in 1910.

The SMS founders were Rudolf Fueter, Hans Fehr, and Marcel Grossmann. Fueter, of Basel origin, left Swizerland in 1899 to study under David Hilbert. After earning his doctorate, he spent time in various European mathematical institutes before returning to Basel as a professor in 1908. He soon realized how fragmented the mathematical community was in Switzerland. Mathematicians from different Swiss universities had no contact with each other whereas mathematicians of German origin were rather looking across the Rhine. One reason Fueter created the SMS was certainly to prevent local and international isolation.

Fueter was a recognized number-theorist. His book on "Synthetische Zahlentheorie", published in 1917 soon after he moved to the University of Zurich, was very successful; a third edition appeared in 1950. Fueter was also involved in many activities outside of mathematics. It is thanks to him and his colleague, the group-theorist Andreas Speiser, that the Swiss House in the Cité universitaire of Paris was built by the famous architect Le Corbusier in 1930. Less known is his activity during the first year of World War II as a colonel of the Swiss army. Responsible for press censorship, Fueter fought courageously for the democratic rights of the Swiss press in 1940. Some of the influential newspapers were openly critical of the Nazi regime. This was viewed as a provocation by Germany, and quite a broad part of official Switzerland supported the German accusations.

Fehr began his career as a mathematics teacher in Geneva and became professor at the University of Geneva in 1900. One of his major contributions was the journal L'Enseignement Mathématique, which he founded in 1899, together with his friend Charles-Ange Laisant, as the first international journal emphasizing mathematics teaching.

Grossmann was a fellow student and friend of Albert Einstein. In 1907 he became professor of descriptive geometry at ETH. After Einstein came back to ETH as a professor of theoretical physics in 1912, Grossmann pointed out to him the relevance of the tensor calculus to general relativity. Their collaboration led to the first paper on the general theory of relativity in 1913. During World War I, Grossmann was very active in improving relations between the French- and German-speaking parts of Switzerland.

The first meeting of the SMS was held in Basel, September 4–10, 1910, with Fueter as president. Fehr succeeded him, and Grossmann was the third president. During its first year, more than one hundred people joined the society; today the SMS has around five hundred members.

Besides national solidarity, mathematicians in Switzerland united to edit the complete works of Leonhard Euler. The far-seeing decision to publish the "Leonhardi Euleri Opera omnia" was taken in 1909 by the SNG. Publication is still under way; it will extend to around one hundred volumes when complete. Many mathematicians in Switzerland contributed to the edition.

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As with most scientific societies, meetings and journals are essential activities of the SMS. There are two meetings every year, the Fall meeting or general assembly, and the Spring meeting, which is dedicated to specialized topics. The SMS owns two journals. "Commentarii Helvetici Mathematicae" was founded in 1928 to make the research of mathematicians in Switzerland better known internationally. Today it is recognized worldwide. Here too Fueter played a decisive role as its main editor until his death. The second journal, "Elemente der Mathematik", was established in 1946 by Louis Locher-Ernst to convey the relevance of today's mathematics to a large circle of readers. Since 2005, both journals have been published by the European Mathematical Society Publishing House in Zurich, founded in 2001 at the initiative of Rolf Jeltsch (ETH Zurich). The decision to leave the previous publisher, Birkhäuser Verlag, was taken after a lively discussion in an extraordinary general assembly of the SMS.

One historical duty of the SMS is to represent the Swiss mathematical community in international organizations. As an example, Fueter met with J. C. Fields in the summer of 1931 and the SMS approved the idea of the Fields medal in the following general assembly. In the last century, the small Swiss mathematical community has clearly been overrepresented internationally. The first International Congress of Mathematicians was held in 1897 in Zurich, as were two later ICMs (1932 and 1994). After the rebirth of the International Mathematical Union in 1952, five IMU presidents were active in Switzerland: Heinz Hopf, Rolf Nevanlinna, Georges de Rham, Komaravolu Chandrasekharan, and Jürgen Moser. More recently Jeltsch was president of the European Mathematical Society.

Today, some nontraditional activities, such as developing links with high-schools, are emerging. However, the SMS is a small society with a very small administration. Its success depends largely on the personal commitment of its members.

The golden age of Swiss mathematics, with the Bernoullis and Euler, was the eighteenth century. As the Bernoulli family occupied the Chair of Mathematics of the University of Basel for nearly one hundred years, Euler had to leave Basel for opportunities in Saint Petersburg and Berlin. In the first half of the nineteenth century, Switzerland had only a few prominent mathematicians. Two of them were active outside Switzerland, the geometer Jakob Steiner in Berlin and the analyst Charles Sturm in Paris. A third was the geometer Ludwig Schäfli, who spent his career at the newly created University of Bern. At that time mathematics had little influence or importance in Swiss higher education. In spite of international recognition, Schläfli waited for more than thirty years to be promoted from "Privat-Dozent" to full professor. His main mathematical contributions are in the field of higher-dimensional Euclidean geometry.

In the second half of the nineteenth century, Switzerland moved from the old confederation of cantons to a modern federal state. The opening of the first federal higher teaching institution, the Zurich Polytechnikum (ETH), in 1855 was a major event of this era. One of its first aims was to train qualified engineers for new Swiss industries and good science teachers for Swiss high-schools. However, basic research was strongly supported very soon. Most of the teaching was in German but, ETH being a federal institution, some courses, particularly in mathematics, were also taught in French.

Many of the new professors came from Germany. A number of young, highly talented German mathematicians took the opportunity in Zurich to start successful careers, among them Richard Dedekind, Elwin Bruno Christoffel, Hermann Amandus Schwarz, Heinrich Weber, and Ferdinand Georg Frobenius. Ever since, it has been a tradition in Swiss universities to invite people without regard to national borders. Later examples are Ludwig Bieberbach and Erich Hecke in Basel, Matyas Lerch in Fribourg, Hermann Minkowski, Adolph Hurwitz, Hermann Weyl at ETH, and Ernst Zermelo at the University of Zurich. Other more recent cases are described in the volume. Some mathematicians remained in Switzerland for their entire careers, but many stayed for only a short time.

Weyl was active in Zurich from 1913 until 1930 and then moved for three years to Göttingen, where he assumed the chair of his former teacher David Hilbert. In 1933, he accepted a call to the Institute for Advanced Study in Princeton, but he never lost his contacts with Zurich, in part for family reasons. As Weyl once said, his seventeen years in Switzerland were the most fruitful of his life: seven books and nearly seventy papers appeared in that period. It was therefore not easy for ETH to cope with the loss of Weyl. After both Emil Artin and Rolf Nevanlinna declined the ETH position, its board followed the advice of Issai Schur and offered it to Heinz Hopf. (Nevanlinna later accepted a position at the University of Zurich).

Born near Breslau, Hopf wrote his thesis in 1925 in Berlin under Bieberbach. He spent the year after his doctorate at Göttingen where he met Paul Alexandrov and began a lifelong friendship. He then stayed for the academic year 1927 to 1928 with Alexandrov at Princeton University, on a Rockefeller fellowship. Solomon Lefschetz, Oswald Veblen, and James W. Alexander were all at Princeton at the time. Back in Berlin, Hopf began working with Alexandrov, at the suggestion of Richard Courant, on a book on topology. ETH was fortunate to find in him a very active young mathematician, a wonderful teacher, and an extremely nice person. Using original sources, Urs Stammbach provides an enthralling description of all that happened on this occasion. Heinz Hopf quickly became well integrated into life in Switzerland. In another recent publication, Stammbach recalls how Hopf and his wife were arrested by the Gestapo in 1939 while on a visit to his parents, and how they were freed thanks to the massive help of the president of ETH, Swiss friends, and colleagues. They became Swiss citizens in 1944. Nevertheless, Hopf's candidacy for the presidency of the SMS in 1947 was rejected, one of the reasons being that he had not been born in Switzerland. The first mathematician of foreign origin to serve as president of the SMS was the French algebraist Peter Gabriel (University of Zurich), for the period 1980 to 1981.

Heinz Hopf had a large number of Ph.D. students. Among them were Eduard Stiefel, Beno Eckmann, and Michel Kervaire. All three played major roles in mathematics in Switzerland, as I will mention later in this review.

To respect seniority, we next turn to two eminent members of the SMS from the French-speaking part of Switzerland: Michel Plancherel and Georges de Rham. Famous for his theorems in harmonic analysis, Plancherel completed his Ph.D. in Fribourg under a mathematician of Czech origin,

Mathias Lerch. Professor from 1911 to 1920 in Fribourg, Plancherel then moved to ETH to succeed Hurwitz. His teaching was well known for its clarity but also for being delivered in very rapid French. In their essay, Norbert Hungerbühler and Martine Schmutz recall that Plancherel was also an excellent organizer and a committed person, who undertook many charges both inside academia and outside in public life. As a high officer of the Swiss army he was responsible for press censorship in Switzerland during the period 1943 to 1945, some years after Fueter. He retired in 1955 and was killed by a car in 1967 on a pedestrian crossing near ETH.

After studies in Lausanne, de Rham worked in Paris under Henri Lebesgue. Very attached to the Romandie and its mountains, he received a joint position at the universities of Geneva and Lausanne. He interacted with many mathematicians and had an important role in the development of mathematics, both in Switzerland and internationally. His work is still strongly represented in modern mathematics. A "glimpse of the de Rham era" offered by Shristi Chatterji and Manuel Ojanguren in the book illuminates many aspects of his attractive personality. Based on de Rham's correspondence and related documents, the essay also provides information about episodes that were not well known or were poorly understood. It is one of the few places in the volume where events during World War II are evoked.

At de Rham's initiative, workshops began to be organized around 1958 in the French-speaking part of Switzerland. Later an official framework, the "troisième cycle romand", financially supported by the different cantons, was created for these workshops. In 1971 Kervaire succeeded de Rham in Geneva. After completing his Swiss thesis with Hopf in 1955, Kervaire, a French citizen, submitted another thesis (on higher-dimensional knots) in Paris in 1964, under Henri Cartan. Claude Weber told me that Cartan was hoping that Kervaire would accept a position in Paris; at that time the French "Doctorat d'État" was a requirement. Nonetheless Kervaire stayed at the Courant Institute from 1959 to 1971 before moving to Geneva. Immediately de Rham asked him to take responsibility for the workshops. Weber, who very efficiently assisted Kervaire in administrative matters, gives us a lively and detailed account of the workshops, especially the famous ones in the small mountainous village of Plans-sur-Bex. The very rustic character of the residence was highly compensated for by the quality of the food, as the numerous participants from all over the world will forever remember!

Stiefel, who completed his Ph.D. thesis in 1935 as one of Hopf's first students in Switzerland, was appointed full professor at ETH in 1943. Well known for his contributions to topology and Lie groups (Stiefel manifolds, Stiefel-Whitney classes!), he switched fields completely around 1948. His new Institute of applied mathematics rapidly gained international recognition, and his leasing of the Zuse electromechanical computer remains famous. Stiefel is primarily responsible for establishing electronic scientific computing in Switzerland. Heinz Rutishauser, one of Stiefel's early collaborators, was very active in the definition of the pioneering algorithmic language Algol 60. Like Fueter and Plancherel, Stiefel was a colonel in the Swiss army.

Stiefel's most famous masters-degree student was Armand Borel, born in la Chaux-de-Fonds in Switzerland. As Stiefel was changing his field of research, Borel moved to Paris to work with Jean Leray for his Ph.D. He immediately participated in the very active Parisian mathematical life. Back to Zurich in 1955 as a full professor, he shortly thereafter left for the Institute for Advanced Study in Princeton. As André Haefliger emphasizes, Borel was not only a great mathematician, but also a man of culture and a propagator of new ideas. One example of this may be seen in the "Borel Seminars" organized every summer in Bern from 1983 to 1986, when Borel came back to Switzerland, again as a faculty member of ETH. Professors and students from all the Swiss universities as well as many foreign guests took part in these seminars. The tradition still continues, although in a different way. The 2011 seminar, for instance, had as its theme real and complex hyperbolic geometry.

Eckmann, born in Bern, studied mathematics at ETH and did his Ph.D. under Hopf in 1941. He began his career in Lausanne, where he had close contacts with de Rham, and he then returned to ETH in 1948. He also attracted many Ph.D. students in differential geometry, algebraic topology, and algebra. Eckmann was interviewed for the EMS newsletter in January 2007, as he was nearing 90; the editors include the interview in this volume. Recalling his student days, Eckmann remembers that Plancherel was a very old-fashioned teacher, but in fact not a bad one! By contrast, Hopf was very modern, teaching in the style of van der Waerden's "Moderne Algebra".

In 1962, as president of the SMS, Eckmann recommended the establishment a Swiss Mathematical Research Institute under the patronage of the SMS that would be financed by the Swiss National Science Foundation. The idea was rejected as being too centralizing. Soon afterward, Eckmann founded the Forschungsinstitut für Mathematik at ETH, today well known as FIM, to have an organization linked to the department, and to welcome visitors to collaborate with faculty members. Although many such institutes exist nowadays, this was not true then. Eckmann ran the Institute for twenty years; Jürgen Moser succeeded him in 1984. Eckmann was also involved in mathematical publishing, particularly as the initiator of the Springer Lecture Notes in Mathematics.

This volume contains contributions dedicated to many other mathematicians, their work, and their interaction with mathematics in Switzerland: Martin Eichler, Hugo Hadwiger, Heinz Huber, Jürgen Moser, Rolf Nevanlinna, Alexander Ostrowski, and Andreas Speiser. Choices had to be made by the editors, but it is a pity that personalities such as George Pólya, Paul Bernays, and Bartel Leendert van der Waerden are absent. Born in Hungary, Pólya came as a Privat-Dozent to the ETH in 1914. Promoted to full professor in 1928, he left Switzerland for the United States in 1940. Of Swiss origin, Bernays left Göttingen in 1933 for Zurich, first in a temporary position at ETH and then as faculty member. Van der Waerden succeeded Fueter at the University of Zurich in 1951 and spent the rest of his career there.

It is striking to observe that women are entirely missing. "In Switzerland mathematics is not considered as a science for women, even if women study mathematics here since more than [a] hundred years," Christine Riedtmann begins

her contribution on women mathematicians in Switzerland. She provides much interesting information that was not easy to collect: about the first female students, their short biographies, women involved in the SMS. Things are changing very slowly here. Let us recall that Switzerland's women were granted full voting rights only in 1971. With the increasing number of women students, there is hope that the proportion of women in faculties will also increase.

There is no systematic presentation of mathematics institutes in the volume, although some of them (Fribourg, Neuchâtel, and the École polytechnique in Lausanne) are briefly described. The École was first an engineering school, a dependency of the University of Lausanne, until 1969 when it was taken over by the federal state as the second Federal Institute of Technology (EPFL) in Switzerland (the first being ETH in Zurich). New departments of chemistry, mathematics, and physics were created at EPFL independently of the existing ones at the University of Lausanne. Charles Blanc, who introduced applied mathematics at the École polytechnique de Lausanne, played a central role in the creation of the new Mathematics Department. To everyone's satisfaction, chemists, mathematicians, and physicists of the University joined EPFL in 2003.

An indirect consequence of the setting up of EPFL was the cessation of the courses taught in French at ETH. Today, as in other institutions, many classes are in English.

Alain Robert's presentation of mathematics in Neuchâtel from 1950 to 1990 is full of interesting details. Robert was a direct witness, first as a student and then as a faculty member, of many events that occurred there, and his report is enhanced by a number of personal memories. Besides, he makes no bones about the hopes and difficulties of the smallest mathematical institute in Switzerland.

Other personal remembrances published in the volume include Christian Blatter's nice description of his life in Basel as a student of mathematics during the late 1950s, and Hirzebruch's essay. Blatter tells us why he decided to study mathematics, how he was thrilled by most of his teachers, and how he worked under Heinz Huber for his Ph.D. on extremal lengths. Friedrich Hirzebruch remembers how warmly Hopf and his wife welcomed him, and gives us a lot of information about his time in Zurich (1948 to 1950), which he obviously greatly enjoyed.

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