

Opening of the exhibition

Transcending Tradition:
Jewish Mathematicians in German-Speaking Academic
Culture

Tel Aviv, 14 November 2011

Introduction to the Exhibition
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Ladies and Gentlemen,

Mathematics is a science that strives for universality. Humans have known how to calculate as long as they have known how to write, and mathematical knowledge has crossed boundaries between cultures and periods. Nevertheless, the historical conditions under which mathematics is pursued do change. Our exhibition is devoted to a period of dramatic changes in the culture of mathematics.

Let me begin with a look back to summer 1904, when the International Congress of Mathematicians convened for the third time. The first of these congresses had been held in Zürich in 1897, the second in Paris in 1900. Now it was being organized in Germany for the first time, this time in the small city of Heidelberg in Germany's south-west.

The congress was dedicated to the famous 19th-century mathematician Carl Gustav Jacobi, who had lived and worked in Königsberg. A commemorative talk on Jacobi was given by Leo Königsberger, the local organizer of the congress. The Göttingen mathematician Hermann Minkowski spoke about his recent work on the “Geometry of Numbers”. Arthur Schoenflies, who also worked in Göttingen and who a few years later would become the driving force behind Frankfurt’s new mathematical institute, gave a talk about perfect sets, thereby advancing the equally young theory of infinite sets. The Heidelberg scholar Moritz Cantor presented new results on the history of mathematics, and Max Simon, a specialist for mathematics education, discussed the mathematics of the Egyptians.

Moreover, a famous mistake made history during the congress. The Hungarian mathematician Gyula König believed to have proved that the continuum hypothesis, one of the crucial open issues of Georg Cantor’s theory of infinite sets, was indeed false. An intense discussion followed that lasted longer than the congress itself. Among the participants were the Berlin mathematician Kurt Hensel and a young extraordinarius in Leipzig, Felix Hausdorff. Hausdorff showed where the mistake had been made: König had made wrong use of a valid theorem in the dissertation of Felix Bernstein.

All these mathematicians, and many others, are featured in our exhibition. The Heidelberg Congress of 1904 was one of many manifestations of an extraordinarily successful German-Jewish culture of mathematics. This culture, which developed during the Wilhelmine Empire of the late 19th century, continued to shape mathematics in Germany throughout the Weimar Republic. It was a culture of cooperation. As the traditional discrimination of Jews in German academia slowly lessened, the number of Jewish mathematicians increased, and both Jewish and non-Jewish Germans worked together at modernizing their science.

In 1933, at the end of the Weimar Republic, there were 94 full professorships in mathematics at German universities. Of these, 20 were held by Jewish mathematicians in January 1933. And as many as 28 positions had been filled with Jewish mathematicians for at least some of the Weimar period. Similar numbers obtain for other types of academic positions.

These Jewish mathematicians included many scholars of international renown, such as Otto Blumenthal, Richard Courant, Max Dehn, Felix Hausdorff, Edmund Landau, Richard v. Mises, Alfred Pringsheim, Issai Schur and many others. Some – first and foremost the towering figure of Emmy Noether in Göttingen – were among the best mathematicians worldwide, even though they never received a professorship in Germany. Between 1830 and 1935, there were roughly 100 Jewish professors and senior independent researchers in the field of mathematics. The number of Jewish doctors of mathematics (which we have not counted) was even higher.

If we remember that up to the middle of the 19th century no Jew had obtained a professorship in any of the German states without converting, and that only very few professors were converted Jews, then these later numbers are remarkable indeed. There are very few other domains of science where we can find parallels. In fact the very first Jewish scholar to obtain a full professorship in Germany without converting to Christianity was a mathematician: Moritz Abraham Stern, who was appointed full professor in Göttingen in 1859.

Soon after 1933, there was not a single Jewish mathematician still in office anywhere in Nazi Germany. The extremely successful German-Jewish culture of mathematics had been abruptly and brutally destroyed. Like other Jews, these mathematicians were dismissed, persecuted, driven out of the country or murdered.

At the time, it was impossible for this rupture of academic culture in mathematics to be overlooked – not even by the most narrow-minded nationalist. Just imagine a situation where, in any scientific discipline existing today, every third scientist were to be dismissed by a state decision within, say, five years. And it was not only in Germany that every mathematician saw what was happening. Mathematicians all over the world realized what was going on, even more so since the flourishing culture of modern mathematics in Germany had been acclaimed and respected for decades.

After the Heidelberg congress, it would take 94 years before the International Congress of Mathematicians returned to Germany. As Christian Bär already mentioned, this ICM was held in Berlin in 1998. Among the young mathematicians who had fled from Germany, only three returned as guests of the 1998 Congress: Michael Golomb, Walter Ledermann and Bernhard Neumann.

For mathematics in Germany, the 1998 Congress represented a **second** effort to examine the Nazi past. In the 1970s, Max Pinl and Lux Furtmüller had collected and published short biographies of mathematicians who had been dismissed and murdered. At the time, these first publications had met with some resistance among German mathematicians. And it was not until the 1990s that a truly serious historical investigation of the persecution of Jewish mathematicians was initiated. A monograph published in 1998 by Reinhard Siegmund-Schulze – and republished in 2009 in English translation under the title *Mathematicians Fleeing from Nazi Germany: Individual Fates and Global Impact* – summarizes the results of this work.

Our exhibition takes a next step. It recalls the culture of mathematics that had developed in Germany before 1933. It recalls a German-Jewish scientific culture of the highest rank. A culture that left its mark – not so much in Germany, where it was destroyed in the years that followed – but in mathematics world-wide.

The exhibition starts with a **first area** describing the political and legal conditions of Jewish academic life in Germany in the 19th and early 20th century. In this section you will also see the names of all Jewish professors and independent researchers that we could find as well as the places where they worked.

The **second, largest area in the exhibition** is devoted to the period of flourishing. The two largest centers of mathematics in Germany, Berlin and Göttingen, are presented here. You will discover that neither of these centers would have risen to its fame without the involvement of Jewish scholars and their families. We have also chosen two smaller cities – Frankfurt and Bonn – where the local culture of mathematics was strongly – and at times almost exclusively – shaped by Jewish colleagues.

The exhibition shows that Jewish mathematicians in all these cities were active beyond the walls of their research institutes. They participated in cultural life, in general education, in public discourse. You will learn about the role of the Mendelssohn family for Berlin mathematics, you will encounter the writer and philosopher Paul Mongré (this is the literary *alter ego* of set theorist Felix Hausdorff), and you will read about the importance of Otto Toeplitz for the Jewish school in Bonn even after 1933.

At the core of the exhibition you will find some 50 mathematical monographs. All of these are classics in their field, and many of them are still read and used in today's research. Whereas the *lives* of Jewish mathematicians could be threatened by the Nazis, their *mathematical ideas and writings* have proved indestructible, and their impact is still strongly felt in every area of modern mathematics. The conference organized by Tsachik Gelander and Wolfgang Lück that is being held here today and tomorrow is a vivid illustration of this fact.

Besides places and writings, the exhibition also highlights the professional infrastructure of mathematics – journals and publishing houses, including the *Verlag Julius Springer*, whose importance for the advancement of mathematics in Germany prior to 1933 can hardly be overestimated. And we present the voice of Jewish mathematicians in some of the great cultural debates of their day.

This heyday of German-Jewish life was a period that transcended tradition in more than one sense. First of all, a long-standing tradition of social and religious discrimination was, finally, at least partially overcome. Second, it was a period that witnessed a decisive reshaping of mathematics as a whole, a period when traditional mathematics became *modern* mathematics, with German-Jewish mathematicians at the forefront of this modernization. Third, because they engaged in a science beyond religious and national boundaries, these German-Jewish mathematicians may also have transcended some limitations of traditional Jewish life – this, at least, was the view of many of those portrayed in our exhibition.

The **third and last part** of our exhibition illustrates – often with documents that are being shown publicly here for the first time – the anti-Semitism facing German-Jewish mathematicians even during the period in which legal discrimination was weakest. One can grasp this form of anti-Semitism particularly well in appointment procedures. The exhibition then recalls the consequences of the Nazi years – on all levels of mathematical culture, including its professional organizations such as the German Mathematical Society. And finally, we briefly address the question of whether or not the mathematicians who had been driven out of the country were welcomed back after Germany's liberation in 1945, and we examine the difficulties of resuming scientific communication between the emigrants and their former colleagues.

For Germans living today these memories are painful, and they leave some of us in anger. But we must be willing to look at history honestly if we hope to connect with the values so many of those described in our exhibition fought for: an academic culture beyond national or religious boundaries, a science whose highest value is to pursue the possibilities of thought, and indeed of a kind of thought that respects only its own inner consistency and rigor. It is precisely for that reason, so these scientists believed, that mathematics can claim universal interest and validity in all human culture.

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Let me add some words of gratitude to all those who have made this exhibition possible. It goes without saying that I cannot mention all those who have contributed to its realization, and thus let me begin with a sincere thanks to all whose names will *not* be mentioned here. Among those that must be named are, first of all, those who gave the first impulses for our project: the local organizers of the annual meeting of the German Mathematical Society in Bonn in 2006 and the president of this society during the “Year of Mathematics” 2008, Günter Ziegler. It was the Deutsche Telekom Stiftung, and, most of all, its president Klaus Kinkel, who provided funding for the German version of our exhibition. Later on, it was also Klaus Kinkel who energetically supported the idea of bringing this exhibition abroad. I am also most grateful to the German Federal Ministry of Research and Education, represented today by State Secretary Cornelia Quennet-Thielen, to the Federal Foreign Office, and to the Ministry of Innovation, Science and Research of the German State North Rhine-Westfalia for their cooperation in setting up the international project.

The content of the exhibition was provided by a team of seven historians of mathematics. In the course of the years we have now been working on the project, we have received valuable advice from many sides; I only want to mention here Reinhard Siegmund-Schulze, Ulrich Charpa, Raphael Gross and Fritz Backhaus.

The design was contributed by Atelier Markgraph in Frankfurt am Main. I have to thank Raimund Ziemer in particular, who tirelessly responded to all our wishes and who has joined us today.

Our thanks go as well to the Springer academic publishing house, whose generosity has allowed us to publish a very comprehensive catalogue of the exhibition. Indeed, the catalogue covers all the main exhibits and offers a wealth of additional material.

I am very grateful to Director Armoni, Mrs. Goldberg, Mrs. Shani, and Mrs. Reuben at Beit Hatfutsot that we can now show our exhibition in this impressive museum. I would like to extend this gratitude to the Madatech in Haifa and the National Library in Jerusalem where the exhibition will be hosted during the coming months.

Last but not least I wish to express my personal gratitude to Ruti Ungar who coordinates the exhibition project in Frankfurt. Without her immense help, this exhibition would not have found its way to Israel.

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Let me finish by saying a word on the music which accompanies this ceremony, and about one of the instruments being played. We opened this ceremony with a piece by Arnold Schoenberg, written in 1908 – it took us right to the center of European culture around the turn of the century, evoking some of the modernism that mathematics, too, was experiencing at this time. We will close with another composer, Felix Mendelssohn – member of the German-Jewish family that was so important for the rise of mathematics in Berlin. His music stands for the optimism that could still be felt by many German Jews, one hundred years before the Nazis came to power.

Just like mathematics, music too survived Nazi destruction. And so did a very special musical instrument. The violin played for us by Yael Barolsky once belonged to Georg Pick, a renowned Austrian mathematician who is known today for many interesting results. Pick, who was the driving force behind Albert Einstein's appointment to Prague, was a gifted musician, and he invited Einstein to play with him in his quartet. On the 13th of July 1942 Pick was deported to Theresienstadt, where he died on the 26th of July, aged 82. Before his deportation he gave his violin to his friend, Herbert Ungar, the grandfather of Ruti Ungar. May this violin evoke some of the history and some of the messages that our exhibition has to convey.

