Transcending Tradition: Jewish Mathematicians in German-Speaking Academic Culture

Reviewed by Marjorie Senechal

Between 2006 and 2008, an exhibition entitled "Jewish Mathematicians in German-Speaking Academic Culture" was developed in Germany and shown in major German cities. Visitors and colleagues urged the organizers to take it abroad. To make it accessible to an international public, the exhibit has been redesigned, with English wall texts, English translations of primary documents, a supertitle "Transcending Tradition", and a handsome catalogue, reviewed here.

The international exhibition (with texts also in Hebrew and Arabic) opened in Israel in 2011 at the Museum of the Jewish Diaspora at Tel Aviv University. "The string quartet that performed one night last week at Beth Hatefutsoth Museum of the Jewish Diaspora played a work by the German-Jewish composer Felix Mendelssohn," said the newspaper *Haaretz*, in its coverage of the opening.[1]

> The violin whose sounds filled the hall that night once belonged to Georg Pick, a well-known Jewish mathematician from Vienna. He is best known for his

eponymous formula, which concerns the connection between number theory and geometry, and he was said to have played this instrument along with his friend Albert Einstein, who also played the violin. On July 13, 1942, Pick was deported to the Theresienstadt concentration camp; two weeks later he died there, at the age of 82. Dr. Ruti Ungar, an Israeli historian who lives in Germany, brought this violin especially for the opening of the new exhibition she has curated…. Ungar's grandfather, Herbert Ungar, was a friend of Pick's. A few days before Pick was sent to his death, he gave Ungar the violin. Herbert Ungar survived the Holocaust and hid the instrument until the war ended.

After Tel Aviv, the exhibition came to the United States, first to the John Crerar Library at the University of Chicago (October–December 2012). If you missed it there, you'll have another chance to see it, at the new Museum of Mathematics in New York City (date to be announced).

This is a review of the exhibition catalogue, not the exhibition itself. The catalogue stands on its own (though one would wish for a more complete index), with contributions from seven historians of mathematics in Germany. These essays are essential to our understanding of the role of Jewish mathematicians in German-speaking academic culture and the tragic end of that community. The text is enriched with illustrations, photographs, maps, tables, and primary documents. Some of these documents were not open to the public until the end of the last century and have changed the received picture.

A word about definitions. Who is a mathematician? Who is a Jew? These are sticky questions; some read-

Marjorie Senechal is Louise Wolff Kahn Professor Emerita in Mathematics and History of Science and Technology at Smith College. Her email address is `senechal@smith.edu`*.*

[1] `http://www.haaretz.com/weekend/week-s-end/setting-the-record-straight-about-jewish-mathematicians-in-nazi-germany-1.397629` *(November 25, 2011).*

[1] `http://www.haaretz.com/weekend/week-s-end/setting-the-record-straight-about-jewish-mathematicians-in-nazi-germany-1.397629` *(November 25, 2011).*

ers may disagree with the editor's choices. Thus trained mathematicians who left the profession, like the novelists Robert Musil and Leo Perutz, are not included, while Felix Hausdorff, who managed to be a writer and mathematician simultaneously, is. Their definition of "Jewish" is broad, though not as broad as that of the Nazis. Thus Christian converts such as Carl Gustav Jacob Jacobi (1804–1851) and Leopold Kronecker (1823–1891) are considered Jewish though they themselves chose not to be. The editors drew the line through their parents' generation: a mathematician is Jewish if "even though they themselves may not have lived according to the Jewish tradition, this tradition was still present at least in the lives of their parents." Had the editors used Nazi criteria, the roll call would have been longer. Georg Cantor's Jewish grandparents did not raise their children in the faith, but had he lived into the Nazi era, he would have been persecuted nevertheless.

"Despite the considerable contribution Jews have made to the field of mathematics, it's not necessarily one of the fields that people imagine of [sic] when they think of great Jewish achievers: Jewish lawyers, doctors and psychologists have shunted the mathematicians aside in the popular imagination," said *Haaretz*. This catalogue, should the wider public read it, will change their minds. The broader story told here—the rise and fall of a talented minority in a hostile culture—requires no special background.

"Jews were not allowed to study at universities in German-speaking areas until 1678, and even then their access to higher education was patchy at best: university access depended on the policies of each German state and on how their authorities related to 'their' Jews," Annette Vogt explains in the opening chapter, "From Exclusion to Acceptance, from Acceptance to Persecution". She tells the stories (I paraphrase her in this paragraph) of several eminent German Jewish families, fleshing statistics with names, doubts, hopes, triumphs. In 1847 Robert Remak Sr. (1815–1865) was the first Jew allowed to submit a habilitation thesis to the Medicine Faculty of Berlin University—after a direct appeal to the Prussian King. His habilitation was a sensation, reported by every Berlin newspaper. His son Ernst Remak (1849–1922) was a famous neurologist; in 1910 he was honored by the German Kaiser with the title "Medizinalrat" (privy medical councilor). Ernst's son Robert Remak Jr. (1888–1942), a mathematician, became Privatdozent at Berlin. He lost his position in 1933 and died at Auschwitz nine tumultuous years later.[2] The Remak family exemplifies the fate of these families, says Vogt, "from expulsion to advance-ment and acceptance, but then again to dismissal, persecution and genocide, all in less than one hundred years."

That wider public has probably never heard of Richard Courant, Max Dehn, William Feller, Felix Hausdorff, Adolf Hurwitz, Carl Gustav Jacob Jacobi, Leopold Kronecker, Edmund Landau, Hermann Minkowski, Emmy Noether, Issai Schur, Olga Taussky, and André Weil, to name a few of the 111 mathematicians featured in this book. For those of us to whom mathematics would be unimaginable without them, the catalogue is instructive too.

In the century between acceptance and persecution, the percentage of Jews in the professional German-speaking mathematical community rose from near zero to a third, despite still-pervasive anti-Semitism (discussed by Vogt in Chapter 7) in academia as well as in social, political, and cultural life. What were their names, where did they work, and what work did they do? The next five chapters address these questions. "People", by Birgit Bergmann, lists names and places, many familiar, some iconic, and some surprising. Her useful maps show their geographical spread: Aachen, Berlin, Bonn, Breslau, Darmstadt, Dresden, Erlangen, Frankfurt, Freiburg, Giessen, Göttingen, Greifswald, Halle, Hamburg, Heidelberg, Karlsruhe, Kiel, Köln, Königsberg, Leipzig, Marburg, Munich, Münster, Strassburg, Tübingen, and Würzberg. Jewish mathematicians also worked in the German-speaking universities of Prague, Vienna, and Zürich. The next chapter comprises four richly detailed essays on Jewish mathematicians at the universities of Berlin, Göttingen (with special emphasis on the activities of Otto Blumenthal, Richard Courant, Emmy Noether, and Paul Bernays), Bonn, and Frankfurt. The first three of these universities are ancient and legendary, and their mathematical giants are well known to all of us.

Frankfurt University was different. Founded in 1914, it welcomed women students from the start and was forbidden, by statute, to consider religion in making appointments. Arthur Schoenflies, previously at Göttingen, was Frankfurt's first full professor in mathematics. Perhaps not coincidentally, his masterpiece, *Krystallsysteme und Krsytallstructur* (1891), enumerating the 230 three-dimensional crystallographic groups, was newly recognized as a key to determining crystal structures (x-ray diffraction was discovered in 1912). Schoenflies died in 1928. His five children were Nazi victims. The catalogue also celebrates Frankfurt's seminar in the history of mathematics, organized largely by Max Dehn. (Today we would describe it as a "great books" or "great works" seminar.) André Weil attended as a young student. "A text would be chosen and read in the original, with an effort

[2] See Reinhard Siegmund-Schultze, Mathematicians Fleeing From Nazi Germany: Individual Fates and Global Impact*, Princeton University Press, 2009, for more details.*
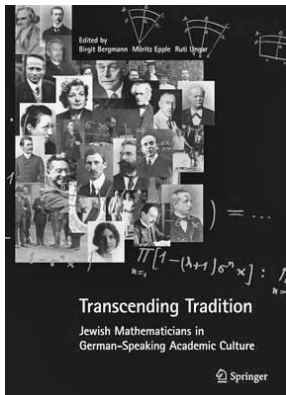
to follow closely not only the superficial lines but also the thrust of the underlying ideas." In his autobiography (quoted in the catalogue), Weil describes Dehn as "a humanistic mathematician who saw mathematics as one chapter—certainly not the least important—in the history of human thought." Ironically and tragically, one of the leading historians of mathematics in Germany, Kurt Vogel, wrote an anti-Semitic article in 1939, evidently to gain political support for this new academic field. The first page of his "Mathematics and Jewry" is shown (without English translation) on page 209 of the catalogue.

Chapter 4, compiled by Walter Purkert, "displays a selection of classic monographs, influential textbooks, and in some cases the collected works and papers of German-Jewish scholars. The list of authors and works spans a wide variety of mathematical fields and their applications," including but not limited to abelian groups, integral operators, Fourier integrals, set theory, elliptic functions, aerodynamics, hydrodynamics, geometry of numbers, game theory, and probability theory. Next, in "Professional Commitment", Moritz Epple and Volker R. Remmert describe the important role of the Springer publishing house in the Weimar era and Ferdinand Springer's close cooperation with Richard Courant and other mathematicians, especially at Göttingen. Here too are periodicals, from *Crelle's Journal* to the *Mathematische Zeitschrift* and the *Mathematische Annalen*, that counted Jewish mathematicians among their authors and/or editors. This essay includes Otto Blumenthal's letter to Hilbert in 1933, offering to resign as managing editor of the *Annalen* for the journal's sake. "I consider it my obligation to resign from my position, should you think that my ancestry or my uncertain situation as a dismissed university professor or anything else related to my person could damage the reputation or the efficacy of the *Annalen*," he wrote, though "giving up this work will cause me pain." Also, in "Mathematics in Culture" Birgit Bergmann describes the leading roles of Jewish mathematicians in popularization and dissemination.

The chapters just described have a twofold purpose. First, they show beyond question that Jewish mathematicians made fundamental contributions to all fields of twentieth-century mathematics and to all activities of the profession. Second, in Purkert's words, they "completely disprove anti-Semitic stereotypes that had claimed the existence of a typical form of 'Jewish mathematics', remote from geometrical intuition or from applications." Sadly, this nonsense did not vanish with the Nazis.[3]

---

[3]*For a modern elaboration see, for example, Steven Gimbel, Einstein's Jewish Science: Physics at the Intersection of Politics and Religion, The Johns Hopkins University Press, 2012.*

In Chapter 8, "Dismissal and Exile", Vogt lays bare the role of the Deutsche Mathematiker-Vereinigung (DMV) in the sordid 1930s. Twenty-two of its twenty-nine pages are primary documents (some also in English translation) and related photographs. The list of documents needs no comment:

 * A letter (September 7, 1933) from the Prussian "Minister for science, art, and education of the people", dismissing Reinhold Baer from his position at the University of Halle-Wittenberg.

 * The questionnaire that Baer had had to fill out, including his religion ("evang.—bis 1920 mosaisch") and his parents' and grandparents' religions (all of them "mosaisch").

* A 1936 article by Emil Julius Gumbel, who had been dismissed from Heidelberg University for his political activities in 1932. "These Heidelberg professors, just like their colleagues all over the Reich, showed no fortitude," he wrote. "Not a word of protest was uttered against the removal from office of so many scholars of outstanding merit… the idea of the university, the idealism, the intellectual forces…all of this evaporated when it came down to their pension rights."

* A letter dated March 28, 1939, from DMV board member Emanuel Sperner to his colleagues Wilhelm Süss, Conrad Müller, and Helmut Hasse, dividing the "non-Aryan and foreigners" still in the DMV into three categories: Jews in Germany, Jews outside of Germany, and Foreigners.

* A letter from Süss to Friedrich Hartogs, four months later: "Dear Professor, You can no longer be a member of the German Mathematical Society. I therefore advise you to declare your resignation from our association. Otherwise we shall announce the termination of your membership at the next opportunity." Signed, "Our sincerest respect, The President, SÜSS." Süss sent this letter to other Jewish mathematicians as well.

* The list of sixty-seven mathematicians in the "List of Displaced German Scholars" compiled by the Academic Assistance Council, London, 1939 (most but not all of these mathematicians were Jewish).

* Photographs of Richard Courant at the Courant Institute in New York and Kurt O. Friedrichs receiving the National Medal of Science from U.S. President Jimmy Carter in 1977.

* A letter from Friedrich Wilhelm Levi to Süss, 1950, describing the difficulties of living in Bombay.

* A photograph of Felix Hausdorff.

* A letter from Courant to Hausdorff (1939) expressing regret that he has been unable to find

a placement abroad for Hausdorff (presumably because of his advanced age).

* A letter of reference for Hausdorff from Courant, 1941. Hausdorff never left Germany. Together with his wife and sister, he committed suicide in 1942.

After the war, Süss founded the Mathematisches Forschungsinstitut at Oberwolfach and made it into the very symbol of the international mathematical community. Though he had been a party (and SS) member, he successfully recast himself as a sort of Oskar Schindler, a Nazi who had used his position as president of the DMV throughout the war to protect Jews from within. The truth remained hidden until late in the twentieth century.[4]

"More than 65 years after the end of the Nazi regime," Vogt concludes this chapter, "additional questions can and should be raised, also with regard to the history of the DMV." There were honorable men: a Berlin pharmacologist, Otto Krayer, rejected a professorship in Frankfurt because its previous occupant had been dismissed. "One question which remains open," notes Vogt, "is whether there were other scientists who rejected positions at German universities because the previous holders had been dismissed. Where, in what disciplines, at what universities were there other scientists who did not wish to benefit from the injustices committed, who declined a promotion at this price? Mathematicians and students of mathematics should raise such questions now, and not shirk away from similar issues."

Three Jewish mathematicians—Friedrich Wilhelm Levi, Hans Hamburger, and Reinhold Baer — returned to a German university after the war. Most did not. "In a country being responsible of the cruel murder of five million Jews I could not breathe," Abraham Fraenkel told Erich Kamke in 1947. The rector of the University of Kiel had the year before inquired as to "whether [Fraenkel] would be interested in returning to the position from which he had been dismissed in 1933." Fraenkel's letter of refusal, which he sent in both Hebrew and English, is reprinted in the catalogue.

The DMV was reestablished in 1948, with Erich Kamke, not Süss, at its head. Kamke invited expelled mathematicians to rejoin. The catalogue does not tell us if any accepted. Max Dehn was one who refused. He was in touch with German colleagues again, he said, but the DMV was another matter. "I have lost the confidence that such an association would act differently in the future than it did in 1935. I fear it would, once again, not resist an unjust measure coming from outside. …I am not afraid that the DMV will once again expel Jews, but perhaps next time it will be so-called communists, anarchists or 'colored people'."

But, gradually, Jewish mathematicians returned for visits and for conferences at Oberwolfach; "on a personal level there were feelings, as one would expect, but on a professional level, people wanted mathematics to come first."[5] "Substantial further historical research will be necessary in order to chart the landscape of Jewish émigré mathematicians and their relations to post-war Germany," says Volker Remmert in the catalogue's concluding chapter. "Mathematicians and historians have only just taken the first steps, and much remains to be done."

In lieu of a concert with Pick's violin, the John Crerar Library at the University of Chicago mounted an exhibition of its own holdings, curated by graduate student Miriam Bilsker, to complement "Transcending Tradition". Subtitled "A Bridge from Germany to America", this exhibition featured material "relating to Jewish mathematicians who fled to America, their friends, and those influenced by them." These included letters, articles, and photographs from the papers of James Franck, a Nobel laureate physicist who "was close friends with many of the mathematicians highlighted in *Transcending Tradition*" and the papers of Emil Gumbel, mentioned above; these demonstrate, says the library's website, the difficulties of a life in exile. "Finally, the exhibit connects the intellectual world of the University of Chicago to the German academic world. It examines the figure of Saunders Mac Lane, the public intellectual and head of the University of Chicago mathematics department who received his doctorate from Göttingen in the 1930s. It presents a look at a short-lived University of Chicago exchange program with the University of Frankfurt which was designed to contribute to the re-education of Germans and to the maintenance of world peace."[6]

An auxiliary exhibit such as this could be mounted in many places in this country. "By the end of the war the total migration [of mathematicians reaching America from the German-language world] was somewhere between 120 and 150," tallied Nathan Reingold. "The actions of the American mathematicians," he said, "is a story of the influence of the ideology of the universality of science;

---

[4]*See Siegmund-Schultze, cited above, and also Volker Remmert, "Mathematical publishing in the Third Reich: Springer-Verlag and the Deutsche Mathematiker-Vereinigung,* The Mathematical Intelligencer*, Vol. 22, no. 3, 2000, 22–30.*

[5]*M. Senechal, "Oberwolfach 1944–1964",* The Mathematical Intelligencer*, Vol. 20, no. 4, 1998, quoting Prof. John Todd. I wrote this article shortly after the DMV files were deposited in the archives of Freiburg University and opened to scholars, but I was unable to study them. I would like to thank Matthias Kreck for warning me that the portrait of Süss-as-Schindler would have to be redrawn.*

[6]http://news.lib.uchicago.edu/blog/2012/10/04/transcending-tradition-a-bridge-from-germany-to-america/.

of the hazards of Depression conditions; of the reactions to the policies of Nazi Germany; of the influence of nationalistic and anti-Semitic feelings in the United States; and of the persistence of the image of the United States as a haven for the oppressed. It is a story of a real world far removed from the certainty and elegance of mathematics as a monument to human rationality."[7]

American mathematicians and historians have not shied away from this story, but we can and I think should do more to highlight the experiences of émigré mathematicians in the smaller or out-of-the-way colleges and universities that welcomed them in those terrible times. Life in America was difficult for many émigrés. They faced resentful colleagues, covert and not-so-covert anti-Semitism, heavy teaching loads, and language difficulties. Reingold adds that many "were startled and troubled by the different methods and attitudes in teaching in American colleges. Very few realized, as one émigré later wrote, 'It takes a long time for anyone not born or brought up in this country to realize…that…the primary aim of a college…is to educate members of a democratic society.'" But that is only part of a more nuanced picture.

Antoni Zygmund, a Polish refugee (not Jewish), taught at Mount Holyoke College from 1940 to 1946; the "Zygmund Collection" is on permanent display in the mathematics department seminar room. MacTutor tells us that Zygmund "later spoke of the peacefulness and security that Mount Holyoke had brought to his family after the distress of their war-time experiences." Mount Holyoke awarded Zygmund an honorary degree in 1988; the honor was mutual.

The November 2010 issues of the *Notices* carried a review of Siegmund-Schultze's excellent book *Mathematicians Fleeing from Nazi Germany*. The reviewer, Michèle Audin, remarks that "such distinguished mathematicians as Max Dehn and André Weil were condemned to positions at Black Mountain College and Lehigh University, respectively."[8] Weil and Lehigh can speak for themselves, and Weil did so in his autobiography. But what do we know about Dehn at Black Mountain? (The college closed in 1956, four years after his death.) Evidently, he was happy there. Black Mountain College, in North Carolina, was avant-garde, not backwater, and Dehn valued that. It was founded in 1933 as a small and fervent bastion of academic freedom, "a community of learning in which decisions would be made in a democratic fashion through consensus reached in open meetings involving faculty and students, ... The college

was owned as a corporation by the faculty as a whole, and there was no outside board to exercise control. There were no required courses."[9] The arts held center stage, and many faculty and students were or became famous: Joseph and Anni Albers, John Cage, Merce Cunningham, Buckminster Fuller, and Robert Rauschenberg are a few. Dehn joined the faculty in January 1945, the end of an odyssey from Nazi Germany to Scandinavia, Russia, and Japan, and several stops in the United States. Dehn and Black Mountain College were a good fit; "Ornaments and rhythms—for Dehn these two were an expression of 'the mathematical ability in humans.'"[10] If the great topologist who had solved Hilbert's third problem and organized the Frankfurt seminar in the history of mathematics felt he'd been condemned to his position, his colleagues never knew it. Black Mountain College is " a wonderful place where I can be together with young people without any institutional impediments," he told Albers. "There, I can use what little abilities I have to transmit to them what I think is leading most surely towards a happy life." He is buried on the campus, today the site of arts festivals.

Most stories did not have such happy endings, but I will end this review on another upbeat note, to record a footnote for posterity. Fritz John (1910–1994), Jewish on his father's side, left Germany in 1933 for England; in 1935 he was appointed assistant professor of mathematics at the University of Kentucky in Lexington. Back in the 1930s, the University of Kentucky was small and isolated but, except for two years of war-related work, John stayed there until 1946, when he moved permanently to New York University. Surely he was glad to rejoin his mentor, Courant. But he made a difference in Lexington; I don't know if he ever knew it.

I grew up near Lexington and took piano lessons from a teacher in town named Helen Lipscomb. Helen was a polio victim, confined to a wheelchair; her brother, Bill, was a chemist at the University of Minnesota. I met Bill Lipscomb for the first time in 2009, two years before he died at the age of ninety-two. By then he'd taught at Harvard for forty years and earned a Nobel prize (1976) for his work on boranes. Unlike me, Bill had attended the University of Kentucky after a Lexington public high school; he'd had a music scholarship and studied chemistry on the side. "Why did you decide to become a chemist instead of a musician?" I asked him. "What changed your mind?" "A math class," he told me. "A math class taught by a German named Fritz John."

---

[7]Nathan Reingold, "Refugee mathematicians, 1933–1941", in A Century of Mathematics in America, Part I, edited by Peter Duren with Richard Askey and Uta Merzbach, AMS, 1988.

[8]*Michèle Audin, "Mathematicians fleeing from Nazi Germany",* Notices of the AMS, *Vol. 57, No. 10, 1300–1302.*

[9]*R. B. Sher, "Max Dehn and Black Mountain College",* The Mathematical Intelligencer*, vol. 16, no. 1, 1994.*

[10]Transcending Tradition, *p. 119. For "ornaments" read "ornamental patterns" and "crystallographic groups".*