Terror and Exile

Persecution and Expulsion
of Mathematicians from Berlin
between 1933 and 1945

An Exhibition
on the Occasion of the
International Congress of Mathematicians 1998

Deutsche Mathematiker–Vereinigung

Authors' corrections to the Catalogue "Terror and Exile"

P. 11, bottom: add source [Rot 1934]

P. 26, bottom: Planck ... read "dated April 3"

P. 27, left, two lines below Planck's portrait: read "On April 6"

P. 61, invert titles of columns "FE before 1945" and "Place of Expulsion"

P. 63, Müntz: died 1956

P. 65, Haenzel: born 1898

Deutsche Mathematiker–Vereinigung
DMV

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International Congress of Mathematicians
Technische Universität Berlin
August 19 to 27, 1998

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Preface

In 1998, the International Congress of Mathematicians ICM returns to Germany after an intermission of 94 years. This long interval covers one of the darkest periods in German history and, therefore, the Deutsche Mathematiker–Vereinigung wants to honour the memory of all those who suffered under the Nazi terror. We do this in the form of an exhibition presenting the biographies of 53 mathematicians from Berlin who were victims of the Nazi regime between 1933 and 1945. The fate of this small group illustrates painfully well the personal sufferings and the destruction of scientific and cultural life; it also sheds some light on the instruments of suppression and the mechanisms of collaboration.

Acknowledgements

Contents

Introduction

Berlin Mathematicians under the Nazi Regime

When Adolf Hitler came to power on January 30, 1933, a long and prosperous era of scientific and cultural life in Germany came to an abrupt ending. Neither the First World War nor the reverberations of the Russian revolution had seriously damaged the basis which supported intellectual and artistic achievements of the highest quality, but the Nazis destroyed it in a few years. The main tools used were the laws against political and "racial" enemies, notably the "Gesetz zur Wiederherstellung des Berufsbeamtentums" (Civil Service Law) of April 7, 1933, and a constant mass propaganda against all "Feinde des Reiches".

Under these circumstances, even a profession of such minor political value as mathematics could not remain untouched and, indeed, German mathematics suffered enormously from the disappearance of the majority of its leading representatives. As many as 144 German speaking mathematicians can be listed who after 1933 had to leave their positions and their homes; most of them emigrated, but some of them lost their lives (The lists in the appendix give our present state of knowledge.)

Among these persecuted mathematicians were at least 53 from Berlin; they form the topic of this exhibition. The restriction to the Berlin group is somewhat artificial and has certain drawbacks. For one thing, outstanding scientists like Richard Courant, Hans Heilbronn, Fritz John, Hans Lewy, Emmy Noether, or Hermann Weyl will not be covered even though their influence has been considerable also after their emigration; they certainly had a stronger impact on the evolution of mathematics than the Berlin group. Furthermore, many aspects of the emigration patterns cannot be fully appreciated without looking at the German mathematical community as a whole.

On the other hand, the group of Berlin emigrants was large and represented well the mathematical trends of that time in Germany. Moreover, many of them showed a remarkable and unexpected involvement in the cultural life of the German capital. Given the political role of the city for the Nazi regime, we could also expect to find typical patterns in the local destruction process. Hence, in summary, we feel not too uncomfortable with the restriction to the Berlin scene.

A methodological difficulty concerns the mathematicians who left Berlin before 1933. Many of them were persecuted by the Nazis elsewhere in Germany (like Salomon Bochner, Richard Brauer, Werner Fenchel, Hans Hamburger, Max Herzberger, Edmund Landau, Leon Lichtenstein, Hans Rademacher, Erich Rothe, Gabor Szegő, and Ernst Zermelo), but for systematic reasons we have chosen not to include them in the exhibition. Others had left Germany before 1933 (e.g. Hans Freudenthal, Robert Frucht, Heinz Hopf, and Karl Loewner) for political reasons or because in Germany academic positions were extremely rare. Freudenthal, Frucht, and Loewner were persecuted as a consequence of the Nazi expansion in Europe; they, too, are not included here. John von Neumann is a borderline case, but in 1933 he held a position in Berlin and is, therefore, included in the exhibition.

In contrast, we have employed a rather general notion of "mathematician" not restricted to researchers in academia. We have included teachers of mathematics, mathematically educated engineers or philosophers, and graduates who decided to work in industry, in order to clarify further the social network surrounding and supporting mathematics before 1933.

We feel that our Berlin case study reveals well some mechanisms of suppression and collaboration, mechanisms which appear, unfortunately, to be common features of human nature not confined to an already distant past. In particular, we consider the reactions of influential mathematicians who kept their positions under the regime.

Almost ninety percent among the persons figuring in the exhibition were "Jewish" by Nazi standards, which is an overwhelming majority. But there was a certain number of "Aryan" mathematicians who were rebuffed, disadvantaged, or persecuted for political resistance which often simply took the form of solidarity with their Jewish colleagues. By and large this brave attitude did not change the course of affairs in any essential way. But it may give us some comfort in considering this dark period, as does the solidarity that was experienced by many emigrants in their host countries.

The exhibition does not live up to modern standards simply by the amount of text it offers, but we expect to address an audience which is motivated enough to spend some time with the documents we have compiled, including some unpublished material of interest to any historian of mathematics. We hope this will contribute to a better analysis of the historical facts.

Above all, we hope that this exhibition will help to inscribe in our memory once more the sufferings of the victims and the failures of the community surrounding them.

Methods of Expelling

Pseudo–Legalism, Boycott, Denunciation

The expulsion of "unwanted" civil servants, among them university professors and school teachers, was set on foot by the Nazis immediately after their seizure of power. The *Gesetz zur Wiederherstellung des Berufsbeamtentums* (Act for the Restitution of a Professional Civil Service, to be denoted as "Civil Service Law" in what follows) of April 7, 1933, interpreted in an executory order a few days later, provided the "legal" means:

§3, the "Aryans clause", ordered the retirement of all civil servants not of Aryan descent. Exempt were the participants of World War I ("Frontkämpfer") and pre–war officials. People having one grandparent of Jewish religion were by definition considered "non–Aryan".

§4, the "political clause", was used, in particular, to dismiss communists in general and social democrats not willing to comply with the new regime. Their pension was cut by 25%.

§6 allowed the retirement of civil servants where it would "simplify the administration". This was used very "flexibly", whenever other reasons could not be constructed.

Issai Schur (see Poster 12) was originally retired under clause 3 of this law which was not applicable to him, and later his retirement was revoked. But such disregard of legal acts, denunciations and National–Socialist student boycotts created an unbearable atmosphere of uncertainty which caused scientists like von Mises and Schur to resign "voluntarily".

Student admissions were soon restricted. With the introduction on April 25, 1933, of the *Gesetz gegen die Überfüllung deutscher Schulen und Hochschulen* (law restricting the size of German schools and universities) the quota of newly matriculated "non–Aryan" students was restricted to 1.5%, that of women to 10%. In 1937 Jewish students lost the right to graduate. Thereafter only a few "half–castes" and foreigners were permitted to continue studying.

The *Mathematisch–physikalische Arbeitsgemeinschaft* (Mapha) of the Berlin University students in the Weimar Republic [Roh 1929; Fe 1980] held liberal positions as opposed to the majority of rightist students. It was disbanded by the Nazis and replaced by a loyal Nazi *Fachabteilung* of the student body.

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Reichsgesetzblatt

Teil I

| 1933 | Ausgegeben zu Berlin, den 7. April 1933 | Nr. 34 |

Inhalt: Gesetz zur Wiederherstellung des Berufsbeamtentums. Vom 7. April 1933................... S. 175

Gesetz zur Wiederherstellung des Berufsbeamtentums. Vom 7. April 1933.

Die Reichsregierung hat das folgende Gesetz beschlossen, das hiermit verkündet wird:

§ 3

(1) Beamte, die nicht arischer Abstammung sind, sind in den Ruhestand (§§ 8 ff.) zu versetzen; soweit es sich um Ehrenbeamte handelt, sind sie aus dem Amtsverhältnis zu entlassen.

(2) Abs. 1 gilt nicht für Beamte, die bereits seit dem 1. August 1914 Beamte gewesen sind oder die im Weltkrieg an der Front für das Deutsche Reich oder für seine Verbündeten gekämpft haben oder deren Väter oder Söhne im Weltkrieg gefallen sind. Weitere Ausnahmen können der Reichsminister des Innern im Einvernehmen mit dem zuständigen Fachminister oder die obersten Landesbehörden für Beamte im Ausland zulassen.

§ 4

Beamte, die nach ihrer bisherigen politischen Betätigung nicht die Gewähr dafür bieten, daß sie jederzeit rückhaltlos für den nationalen Staat eintreten, können aus dem Dienst entlassen werden. Auf die Dauer von drei Monaten nach der Entlassung werden ihnen ihre bisherigen Bezüge belassen. Von dieser Zeit an erhalten sie drei Viertel des Ruhegeldes (§ 8) und entsprechende Hinterbliebenenversorgung.

§ 5

(1) Jeder Beamte muß sich die Versetzung in ein anderes Amt derselben oder einer gleichwertigen Laufbahn, auch in ein solches von geringerem Rang und planmäßigem Diensteinkommen — unter Vergütung der vorschriftsmäßigen Umzugskosten — gefallen lassen, wenn es das dienstliche Bedürfnis erfordert. Bei Versetzung in ein Amt von geringerem Rang und planmäßigem Diensteinkommen behält der Beamte seine bisherige Amtsbezeichnung und das Diensteinkommen der bisherigen Stelle.

(Vierzehnter Tag nach Ablauf des Ausgabetags: 21. April 1933)
Reichsgesetzbl. 1933 I

§ 6

Zur Vereinfachung der Verwaltung können Beamte in den Ruhestand versetzt werden, auch wenn sie noch nicht dienstunfähig sind. Wenn Beamte aus diesem Grunde in den Ruhestand versetzt werden, so dürfen ihre Stellen nicht mehr besetzt werden.

Erste Verordnung zur Durchführung des Gesetzes zur Wiederherstellung des Berufsbeamtentums. Vom 11. April 1933.

Auf Grund des § 17 des Gesetzes zur Wiederherstellung des Berufsbeamtentums vom 7. April 1933 (Reichsgesetzbl. I S. 175) wird verordnet was folgt:

Zu § 2   1.

Ungeeignet sind alle Beamten, die der kommunistischen Partei oder kommunistischen Hilfs- oder Ersatzorganisationen angehören. Sie sind daher zu entlassen.

Zu § 3   2.

(1) Als nicht arisch gilt, wer von nicht arischen, insbesondere jüdischen Eltern oder Großeltern abstammt. Es genügt, wenn ein Elternteil oder ein Großelternteil nicht arisch ist. Dies ist insbesondere dann anzunehmen, wenn ein Elternteil oder ein Großelternteil der jüdischen Religion angehört hat.

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Upper Left: The burning of "un–German" publications in May 1933

Upper Right: Student meeting in front of Berlin University 1935

Lower: "Boycott Day" April 1, 1933. The text of the posters is bilingual because the Nazis maintained that there was a foreign campaign against Germany.

Page 7: In 1933 Michael Sadowsky's teaching permit was revoked because his wife was of Jewish descent. However, the legal base for such a decision was established only in 1937.

- Seite   2 -

Wie die Herren Prof. R o t h e   und   H a m e
mitteilten , ist Dr. Sadowski mit einer Jüdin
verheiratet , sodass für ihn keine Aussichten vor
handen sind , die akademische Laufbahn in Deutsch
land fortzusetzen .

Die Fakultät bittet, Dr. Sadowski die
Lehrberechtigung an der Technischen Hochschule
Berlin zu entziehen und ihn in den Listen der
Hochschule zu streichen .

Der Dekan .

=========

-3. AUG. 1934

Technische Hochschule Berlin   Charlottenburg, den 28. Juli 19
Tgb.Nr. 4158 T.H.   UI 32641 34
======================

Preuß. Ministerium f. Wissenschaft,
Kunst u. Volksbildung.
Eing.: - 3. AUG. 1934

Urschriftlich   mit 1 Anlage
dem Herrn Minister für Wissenschaft,
Kunst und Volksbildung,
B e r l i n
==================

überreicht. Ich kann dem Antrage um nochmalige Beurlaubu
für ein Jahr ebenfalls nicht zustimmen; ich schließe mich
vielmehr dem Antrage des Dekans an und bitte, Dr. Sadows
die Lehrberechtigung an der Technischen Hochschule Berli
entziehen.

Die Beurlaubung für das Studienjahr 1933/34
ist durch Randerl. vom 30.11.1933 - UI Nr. 33884 - geneh
worden.   Der Rektor
i.V. Weber

Five Leading Non–Jewish Berlin Mathematicians

Their Reactions to the Nazi Regime and to the Expulsion of Their Colleagues

The most influential non–Jewish mathematicians in Berlin around 1933 were Theodor Vahlen in the Ministry for University Affairs, Ludwig Bieberbach and Erhard Schmidt at the University, and Georg Hamel and Rudolf Rothe at the Technische Hochschule Berlin–Charlottenburg.

All five of them shared nationalist convictions towards a revision of the effects of World War I — like the majority of their colleagues, including quite a few of those later discriminated as "Jews" like Richard von Mises (see Posters 5/6). Such convictions, however, paved the way for the Nazi takeover at the universities.

The reactions of these five men to the anti–Semitic Nazi politics were widely different. They ranged from the unconditional and active enforcement of dismissals by the long–standing Nazi Vahlen; over Bieberbach's sudden conversion to National Socialism; the unscrupulous functionary mentality of Hamel who desired solely to keep the business of mathematics going; to Erhard Schmidt's personal rejection of anti–Semitism paired with his appreciation of the regime's "successes of foreign policy"; and to signs of public opposition demonstrated by Rothe.

With the possible exemption of Rothe, in all these persons their sympathy with the regime, their concern about the survival of mathematics, or their fear of Nazi terror outweighed any intention for resistance. Attempts at opposition occurred more often among mathematicians of lesser influence, and of course provoked a negative effect for their career, or even led to persecution by the Nazis (see Poster 20).

Theodor Vahlen (1869–1945) began as an algebraist after having studied with Leopold Kronecker in Berlin. Although not of great mathematical note, he nevertheless gained a position as Professor at the University of Greifswald. His book *Abstrakte Geometrie* (1905) received a harsh critical review by the Jewish mathematician Max Dehn. whom he later — as responsible official — dismissed. Vahlen held militaristic and anti–Semitic positions, and had called mathematics "a mirror of race" already in 1923. He turned towards applied mathematics, in particular ballistics and nautics. Between 1924 and 1927 he was

Theodor Vahlen

Gauleiter of the Nazi party NSDAP in Pommerania but was dismissed as professor in 1927, because of anti–republic activities. In 1933, then 64 years of age, he was installed by the Nazis in the Ministry for University Affairs, where he became responsible for the hiring of professors. He succeeded von Mises as director of the Institute for Applied Mathematics at the University of Berlin, joined Bieberbach in the publication of the racist mathematical journal *Deutsche Mathematik,* and even became the acting president of the *Preußische Akademie der Wissenschaften.* (See also Poster 6) [Sie 1984]
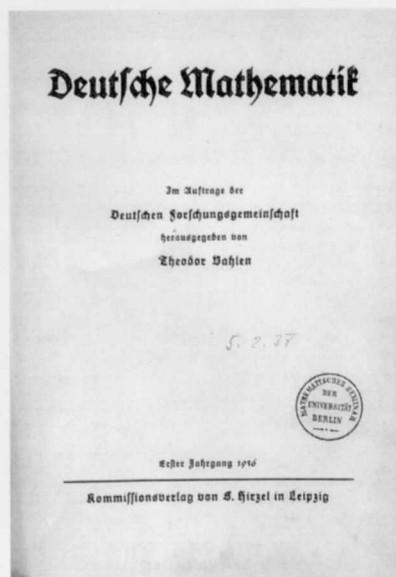
Ludwig Bieberbach

Ludwig Bieberbach (1886–1982) was a renowned function–theorist and geometer. His *Habilitation* (1911/12) on groups of Euclidean motions was a first important step towards the solution of Hilbert's eighteenth problem. The concrete reasons and circumstances of Bieberbach's conversion to National Socialism which he considered with scepticism before 1933, to say the least, are not yet fully known. In 1934, as managing editor of the *Jahresbericht der Deutschen Mathematiker–Vereinigung*, Bieberbach published an "open letter" against the Danish mathematician Harald Bohr, who had criticized Bieberbach's racist theories in mathematics (called *Deutsche Mathematik* like the journal). Since Bieberbach published this open letter without the consent of his co–editors he was criticized at a meeting of the DMV in Bad Pyrmont and had to resign his position. He lived a much longer life than many victims of the regime he once supported. But he did not live long enough to see the proof of his famous conjecture (1916) concerning co-efficients of schlicht functions, established by Louis de Branges in 1984. (See also Posters 12 and 20) [Meh 1987]

Kurt Hirsch (see Poster 11) wrote on Bieberbach's early reaction to a boycott against Schur in April 1933: "I can tell you from my own experience that at least on the first of April 1933, he was still quite a sane man. That was the so–called 'Boycott Day', the day on which Jewish shops were boycotted and Jewish professors and lecturers were not allowed to enter the university. Everybody who was there had to make a little speech about the rejuvenation of Ger-

many, etc. And Bieberbach did this quite nicely and then he said, 'A drop of remorse falls into my joy because my dear friend and colleague Schur is not allowed to be among us today.'" [Hir 1986; 39]

However, in his Easter lecture to the *Förderverein* for mathematical education in 1934, Bieberbach commented on the dismissal of the famous Göttingen number theorist Edmund Landau: "A few months ago differences with the Göttingen student body ended the teaching activities of Herr Landau ... This should be seen as a prime example of the fact that representatives of overly different races do not mix as students and teachers ... The instincts of the Göttingen students felt that Landau was a type who handled things in an un–German manner." [Meh 1987; 227], [Bieb 1934]

Georg Hamel

Georg Hamel (1877–1954) was professor of mathematics and mechanics at the Technische Hochschule Berlin–Charlottenburg. He was a student of Hilbert and worked on the foundations of mechanics. He was the permanent chair (later the "Führer") of the *Reichsverband deutscher mathematischer Gesellschaften und Vereine* (founded in 1921), which was a political interest organization to rally adequate support for mathematics, especially with respect to education and curricula at schools and universities. In September 1933 he formulated his loyalty to the regime as follows: "We want to cooperate sincerely and loyally in accordance with the total state. Like all Germans, we place ourselves unconditionally and happily in the service of the National Socialist movement, behind its Führer, our chancellor Adolf Hitler ... Mathematics as a teaching of spirit, of spirit of action, belongs next to the teachings of blood and soil as an integral part to the entire educational process." [Meh 1989; 48, 55]

Page 10: In 1928 Bieberbach and Schur had jointly published a significant paper. Nevertheless, after 1933 Bieberbach participated in the expulsion of Schur.

510   Sitzung der physikalisch-mathematischen Klasse vom 13. Dezember 1928

Über die Minkowskische Reduktionstheorie der positiven quadratischen Formen.

Von L. Bieberbach und I. Schur.

Am 31. Juli d. J. waren acht Dezennien verflossen seit dem Tag, da Dirichlet in einem Vortrag vor der Preußischen Akademie der Wissenschaften seine Theorie der Reduktion der binären und ternären quadratischen Formen bekanntgab. Sie ist auf die geometrische Deutung gegründet, die Gauss 1831 herangezogen hat. Hiernach bedeutet eine definite quadratische Form das Quadrat der Entfernung in einem kartesischen Koordinatensystem und gehören äquivalente Formen zu Koordinatensystemen, die durch unimodulare ganzzahlige Transformationen auseinander hervorgehen, d. h. zu den verschiedenen Arten, das Gitter der Punkte ganzzahliger Koordinaten nach kongruenten Parallelepipeda zu zerlegen. Die Auswahl einer — oder doch endlich vieler — Formen in jeder Klasse äquivalenter Formen ist das Problem der Reduktion. Dirichlet gab in jenem, Crelle 40 und Ges. Abh. Bd. II abgedruckten Vortrag die folgende Reduktionsvorschrift an: Man wähle unter allen Gitterpunkten einen, der am nächsten beim Ursprung der Koordinaten liegt. Der Vektor vom Ursprung zu ihm hin liefert den ersten Einheitsvektor des Koordinatensystems, das der reduzierten Form entspricht. Alsdann wähle man unter allen Gitterpunkten, die nicht auf der Verbindungslinie des erstgewählten mit dem Ursprung liegen, einen derjenigen, der am nächsten am Ursprung liegt. Der Vektor vom Ursprung zu ihm hin ist der zweite Einheitsvektor des Koordinatensystems, das der reduzierten Form entspricht. Alsdann betrachte man die Gitterpunkte enthaltenden Ebenen, welche diesen beiden ersten Einheitsvektoren parallel sind, und wähle unter diesen eine, welche von der Parallelebene durch den Ursprung die kleinste von Null verschiedene Entfernung hat, und auf ihr einen derjenigen Gitterpunkte, welcher die kleinste darauf mögliche Entfernung vom Ursprung hat. Der Vektor vom Ursprung zu diesem Punkte hin ist der dritte Einheitsvektor des Koordinatensystems, welches der reduzierten Form entspricht. Es ist klar, daß man analoger Vorschrift entsprechend auch bei Formen von beliebig vielen (*n*) Veränderlichen reduzierte Formen definieren kann. Gleichwohl ist bisher erst nur für $n = 2$ und $n = 3$ die analytische Durchführung der Theorie vorgenommen worden[1]. Dies liegt daran, daß der Fall $n = 3$ einem glück-

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[1] Dies gilt auch von der folgenden Modifikation der Dirichletschen Theorie, die sich durch ihre größere Symmetrie zu empfehlen scheint. Man bestimmt den ersten Einheitsvektor wieder als einen der kürzesten, sucht dann aber eine der Gitterpunkte tragenden ihm parallelen

Erhard Schmidt

Erhard Schmidt (1876–1959) was a student of Hermann Amandus Schwarz in Berlin and of David Hilbert in Göttingen. He obtained his *Habilitation* in Bonn in 1906, and held positions in Zürich, Erlangen and Breslau before he came to Berlin in 1917. He had formalized Hilbert's various ideas on integral equations into the single concept of Hilbert space around 1905, thereby introducing many geometrical terms. Although his interest was mainly in concrete problems of analysis and geometry he must be considered a founder of modern abstract functional analysis. In 1929, as Rektor of the University he called the police to clear the university from rioting National Socialist students. At that time he complained about the "desert of political and racist hate–propaganda which surrounds us". Nevertheless, in 1933, Schmidt complied with a resolution which expressed "no regret" with regard to Einstein's withdrawal from the Prussian Academy of Sciences. [Sie 1987; 81/82]

One of Bieberbach's assistants, the Nazi–activist Werner Weber, reported to the secret police on Schmidt in 1938: "I think that Schmidt does not at all understand the Jewish question". [UAB 1]

Menahem Max Schiffer (see Poster 11) remembered a conversation between the dismissed Issai Schur and Erhard Schmidt in 1938: "When he complained bitterly to Schmidt about the Nazi actions and Hitler, Schmidt defended the latter. He said, 'Suppose we had to fight a war to rearm Germany, unite with Austria, liberate the Saar and the German part of Czechoslovakia. Such a war would have cost us half a million young men. ... Now Hitler has sacrificed half a million Jews and has achieved great things for Germany. I hope some day you will be recompensed but I am still grateful to Hitler.'" [Schi 1986]

Hans Freudenthal (1905–1990) who as a Jew survived the German occupation of the Netherlands said on the occasion of Schmidt's 75th birthday celebration in Berlin in 1951: "It is so easy to practise the hon-

esty that mathematics demands in mathematics itself. If you don't, you will be punished quickly and bitterly. It is so much more difficult to stick to this virtue, proven with numbers and figures, against humans and friends. That we outside, excluded for years from a hostile Germany, know this, and never doubted on you, this is evident from the large number of contributions that from abroad have reached the editors of the *Festschrift*." [Ans 1951; 18]

Rudolf Rothe

Rudolf Rothe (1873–1942) studied at the University of Berlin and, in 1897, wrote his dissertation *Untersuchungen über die Theorie der isothermen Flächen* under the supervision of Hermann Amandus Schwarz. Since 1915 he was full professor at the Technische Hochschule had at the same time a teaching assignment for calculus and differential geometry at the University during World War I. He worked in complex function theory and geometry, and edited the works of Karl Weierstraß. The wide–spread nationalist position after the defeat of Germany in World War I is palpable in his address to the students after beeing elected Rektor of the Technische Hochschule in 1921: "From your ranks shall rise the leaders of our nation to guide it in its cultural and spiritual renewal. ... Let us all remember the aim to prepare this and the coming generations for the time when our saviour shall appear." [Rot 1921; 236] Later Rothe stood up for Jewish colleagues such as Ernst Jacobsthal (see Poster 9). In 1934 he delivered an obituary for the Russian mathematician Dmitrij Fedorowitsch Seliwanoff (1855–1932) who was expelled from the Soviet Union to Prague; it can be read as an indirect criticism of Bieberbach's *Deutsche Mathematik* and the expulsion of Jewish mathematicians: "Seliwanoff, when asked why he was banned from Russia, would answer the only thing that one could accuse him of is that he did not teach mathematics in a 'red' manner. But never would he be able to imagine what a 'red' tuition in mathematics could be".

Applied Mathematics at the University
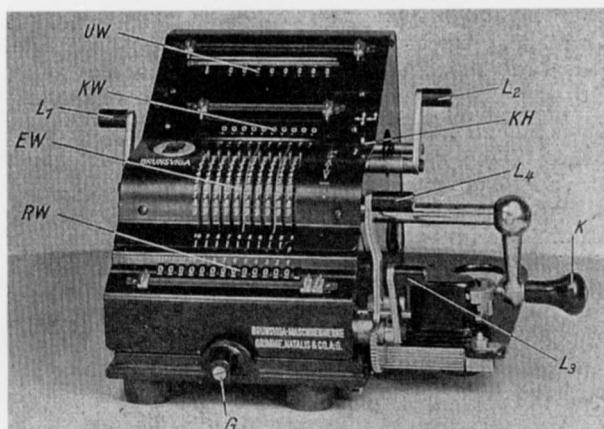
When von Mises came to Berlin in 1920 there was not even a simple Brunsviga in the Mathematics Institute and he had to struggle to obtain the necessary equipment.

In 1920, an Institute for Applied Mathematics was founded at the University of Berlin. It was endowed with a rather low budget and no more than two regular positions. [Ber 1980] The need for such an institute was expressed by Erhard Schmidt in 1918 in a memorandum of the Philosophical Faculty of the University to the Ministry. It says: "The pervasion of practical life by mathematical methods, as a result of the development of technology before the war and, above all, the unexpected need for ... mathematicians during the war make it an undeniable necessity to install applied mathematics at the largest Prussian university ... Among university students, however, one frequently finds the opinion, that applied mathematics is a subject of inferior importance, which does not require one's full attention. To create a new tradition, it needs an important personality of approved name. Such a personality can only be attracted by a full professorship." [Bier 1988; 186]

The "important personality" who, in 1920, became the first director, was Richard von Mises.

His influence was later described by the mathematician Alexander Ostrowski (1893–1986): "Only with the appointment of Richard von Mises to the University of Berlin did the first mathematically serious German school of applied mathematics with a broad sphere of influence come into existence. Von Mises was an incredibly dynamic person and at the same time amazingly versatile like Runge. He was especially well versed in the realm of technology. Because of his dynamic personality his occasionally major blunders were somehow tolerated. One has even forgiven him his theory of probability. At the same time the mathematical atmosphere in Berlin was much more open and less tense than in Göttingen. The sovereign Olympian, Erhard Schmidt, Is-

sai Schur's evident sense of what was mathematically important, and Bieberbach's impulsive youthfulness created a mathematical climate that was very favorable to von Mises' activities." [Ost 1966; 106]

Lothar Collatz (1910–1990), who later became a leading applied mathematician in Germany, but around 1933 was without a chance to get an appointment in Berlin, recalled his encounters with von Mises in a letter of 1987: "I was enrolled in Berlin in 1930. ... Prof. Dr. Richard von Mises had explained in his excellent, very clear and stimulating lectures on applied analysis ... that it would be desirable to develop difference methods of higher exactness. ... I took the Staatsexamen in November 1933, and Prof. von Mises examined me on the day before his departure. The same day, he talked to me for about one hour, giving advice for my further research. ... I met Prof. v. Mises again only several years after the war." [Sie 1989; 52]

The rise of the Nazi regime in 1933, perhaps surprisingly, did not strengthen the position of applied mathematics against that of pure mathematics at the university. Instead, the government support was shifted to applied mathematical research conducted in institutes of the *Kaiser–Wilhelm–Gesellschaft* (in Göttingen) or of the *Luftwaffe* in Braunschweig and Berlin–Adlershof, hence to institutions outside the universities. [Meh 1986], [Sie 1989]

In the letter quoted above Collatz commented also on the general situation of applied mathematics under the Nazi regime: "In those days there was a general and rapid decline of numerical and applied mathematics. Runge had died some years before, Courant had to leave some years later. Also Trefftz died soon after. Renowned students of Courant, e.g. Friedrichs, Lewy, and others left Germany. Dr. Hilda Pollaczek–Geiringer left together with von Mises, and one could add still other names. Of course, this common decline also hit Berlin. And it hit the whole of Germany. Göttingen, too." [Sie 1989; 52/53]

The "other names" of expelled applied mathematicians include numerous mathematicians from Berlin, e.g. Arthur Korn, Hans and Erich Reissner, Hans Baerwald, Stefan Bergman, Paul Nemenyi, Chaim Müntz, Felix Pollaczek, Fritz Herzog, Michael Golomb, Feodor Theilheimer, and Michael Lotkin. The four last–named mathematicians of younger age turned to applications only after emigration to the United States. They adapted to the needs arising with the vigorous development of applied mathematics in the United States enforced by the demand of military agencies.

Richard von Mises (1883–1953)

The Leading Representative of Applied Mathematics in Berlin

Richard von Mises

Richard von Mises was born in 1883 in Lemberg (now Lwów), then a part of Austria. After earning a doctorate in engineering in Vienna he got his *Habilitation* in Brünn (Brno) in 1908, and, in 1909, became professor at the University of Straßburg. He qualified as a pilot and, in the summer of 1913, he gave what is believed to be the first university course on the mechanics of powered flight. In the first months of the war he served as a pilot in the Austrian army, and constructed a large airplane bearing his name. Von Mises was an outstanding practitioner of mathematics and produced fundamental contributions to almost all fields of applied mathematics. In 1920 he became the first director of the newly founded Institute for Applied Mathematics at the University of Berlin. In 1921 he founded the *Zeitschrift für Angewandte Mathematik and Mechanik.* "The intuitive appeal of von Mises' limiting frequency theory of probability, which he developed at that time, is strong. Its spirit has influenced all modern statisticians. The mathematics of the theory, however, has never been rendered widely acceptable and the measure–theoretic approach, initiated by Kolmogorov in 1933 is most favored. Von Mises was a scholar with wide interests, who wrote perceptively on the philosophy of science from a positivist point of view (see Poster 19), and who was also an authority on the poet Rilke." [DSB, vol. 9; 420].

Although Jewish (in Nazi–terms), von Mises was for-

mally not affected by the Nazi law of April 1933, since he had been both a pre–war official and a participant in World War I. However, von Mises soon recognized the implications of the new regime and accepted a newly founded chair in Istanbul (Turkey). In 1939 he emigrated to the United States where, in 1944, he became a Professor at Harvard University.

In a speech in 1930 von Mises expressed the patriotic views then widespread in Germany: "We commemorate with deepest respect above all the immeasurable stream of dead, who were with us in the war but who did not return, who had tried so courageously, with unshaken discipline, and loving enthusiasm to keep the horror of the war away from Rhineland, but who were not able to spare it the enemy's occupation after the war. We also remember sadly the country which has been lost and not yet been liberated, and that we cannot stand on again this day." [Mis 1930; 885]

KATALOG
DER RILKE-SAMMLUNG
RICHARD VON MISES

Bearbeitet und herausgegeben
von Paul Obermüller und Herbert Steiner
unter Mitarbeit von Ernst Zinn

IM INSEL-VERLAG

The poet Rainer Maria Rilke

Though leaving the country von Mises still cared for the rising generation in applied mathematics in Ger-

many. On June 10, 1933 he wrote to Theodor von Kármán in California on behalf of the young German Walter Tollmien who was looking for a position: "I'd like to return to the matter of Dr. Tollmien. I don't know if he still has the desire to come to Germany under the present circumstances. In any case, I have to advise you that the irrevocable prerequisite for any kind of employment or scholarship or suchlike is to make a statement on his word of honour that his four grandparents are 'Aryan' and in particular are of non–Jewish descent. As long as I do not know if Dr. Tollmien can or will make such a statement it is impossible for me to do anything. Besides I believe that in a favourable case the prospects are not quite so bad as indeed a large part of all the previous candidates can be omitted under the present law. I request that you let me have the relevant information as soon as possible" Kármán wrote on the reverse side of this letter: "Dear Mr. Tollmien, enclosed a letter from H. v. Mises. Indeed a 'document of our time'. Please let me know if I should transmit the written evidence about your racial purity to Berlin or if you want to write to Mises yourself. Please send the letter back to me after you have read it." [Kármán Papers 20.37]*

After accepting the position in Turkey Richard von Mises had to negotiate with the Nazi ministry about his pension and other such claims. He had requested in a letter to the ministry on October 12, 1933 that he be allowed to retain his pension in the event of his accepting a chair in Istanbul, "as the acceptance of such a chair is indeed in the interest of the German Reich." [UAB 2] However, in a reply from the ministry von Mises was required on December 1, 1933 to relinquish all claims on salary, pension and support for surviving dependants. [UAB 2] In response Richard von Mises wrote to the ministry on December 21, 1933: "With my application, of October 12, I requested my dismissal from the civil service according to the applicable legal regulations. After twenty–four years of service I fail to see any reason for an explicit relinquishment on my part of claims which I am entitled to according to law. I request a decision as soon as possible so that I can finally accept the position I have been offered in Turkey." [GSA 1]

The mathematician and long serving National Socialist Theodor Vahlen (see Poster 3) was at that time officially responsible in the Ministry for University Affairs for arranging the succession to von Mises. Vahlen, although already 64 years old, wanted to take over the post of Director of the Institute for Applied

Mathematics himself. One of the last official tasks of Richard von Mises in Berlin was to write a recommendation of possible candidates for his succession. Hoping to ensure the survival of the Institute and maybe also of his pension rights he recommended the Nazi Vahlen as his successor for at least a transitional period. In a letter to Erhard Schmidt on October 21, 1933, he wrote: "As far as the final arrangement is concerned, in my opinion, the only successor who can be taken into consideration for the time being is Prof. Erich Trefftz in Dresden. However, it appears possible and beneficial to find an interim solution for the coming years, i.e. to find someone who would be capable of safeguarding the existence of the Institute, thus maintaining the applied mathematics in Berlin possibly even in a direction that fits the current developments. I suggest that Professor Th. Vahlen, who is active at the moment in the Ministry for University Affairs, but who evidently isn't happy there, should accept the professorship and take over the Institute for Applied Mathematics." [Mises Papers 1] However, at the same time von Mises couldn't do without giving Vahlen several blows in his report attesting him among others things that "with deliberate renunciation he addresses relatively elementary tasks".

Von Mises long–term goals would not be achieved by any means. Vahlen accepted the directorship on December 4, 1933. However, on January 5, 1934 Richard von Mises, by then already in Istanbul, was denied all his rights of financial claims by the ministry. [UAB 2] Moreover, after Vahlen had retired two years later, Trefftz, the candidate whom von Mises wanted, was not nominated because of political reasons and the Institute fell into the hands of a party liner, the mathematical astronomer Alfred Klose.

The affair continued to affect von Mises even after the war. When he applied for reparation, the *Innenministerium* (Federal Ministry of the Interior) initially alleged that his departure from Berlin had been voluntary. In his response of February 10, 1953, shortly before his death, von Mises made clear that he had been deceived by Vahlen: "Dr. Vahlen assured me emphatically that my departure abroad, accepting the offered chair, would not change anything regarding my pension rights acquired in my previous years of service. Later, on December 1, I received a demand to relinquish my claims, whereupon I replied that I was not prepared to comply with such a demand." [Mises Papers 1]

* see page 15

PROFESSOR DR. v. MISES

SCHRIFTLEITUNG DER ZEITSCHRIFT FÜR ANGEWANDTE
MATHEMATIK UND MECHANIK

BERLIN NW 87, SIEGMUNDSHOF 9
FERNRUF: C 9 TIERGARTEN 6692
VDI·VERLAG G·M·B·H

Z 129/33

BERLIN NW 87, DEN   10. Juni 1933

Herrn

    Prof.Dr.Th.v.Kármán

    California Institute of Tech-
        nology
          Pasadena

Lieber Freund!

    Die Arbeit von Herrn Biot will ich gern in die Zeit-
schrift aufnehmen, obwohl wir stark überlastet sind und es
eine gute Weile dauern wird.

    Ich möchte nun zurückkommen auf die Angelegenheit des
Dr.Tollmien. Ich weiss nicht, ob er unter den heutigen Ver-
hältnissen noch den Wunsch hat, nach Deutschland zu kommen.
Jedenfalls muss ich mitteilen, dass die umumstössliche Vor-
aussetzung für jede Art von Anstellung oder Stipendium oder
dergl. die Abgabe einer ehrenwörtlichen Erklärung ist, dass
seine vier Grosseltern "arischen, insbesondere nicht-jüdischen
Ursprungs" sind. Solange ich nicht weiss, ob Herr Tollmien
diese Erklärung abgeben kann und will, ist es mir unmöglich,
irgendetwas zu tun. Im übrigen glaube ich, dass im günstigen
Fall die Aussichten nicht ganz schlecht sind, da ja ein gros-
ser Teil aller früheren Bewerber für derartige Dinge ausfällt.
Ich bitte Dich, mir möglichst bald Auskunft über diese Frage
zukommen zu lassen.

                  Mit den besten Grüssen

(handwritten letter, left column)

R. v. Mises
10 Chauncy Street
Cambridge 38, Massachusetts
11. 13. [1957]

Lieber Herr Bieberbach,

(handwritten German text)

(handwritten letter, right column, continued)

Hilda v. Mises

" ... I believe what you write about the departure of von Mises immediately after the takeover of power is very accurate. It was his pride, his intelligence and his instinct which caused him to resign from a position which had become unbearable".

Richard von Mises' reparation would only be decided after his death. The *Innenministerium* also requested Ludwig Bieberbach's expert opinion (see Poster 25). In a letter of November 13, 1957, Hilda von Mises thanked Bieberbach for his positive recommendation. [Bieberbach Papers]

In March 1939, in a letter to Theodor von Kármán regarding the reason for his efforts to emigrate to the United States von Mises explained:

"The risk of being taken over by the Third Reich is too grave." [Kármán Papers 79.25]

Stefan Bergman (1895–1977)

A Refugee in Three Countries

Born 1895 in Czestochowa (Poland), Stefan Bergman studied engineering in Breslau and Vienna and entered the Institute for Applied Mathematics at the University of Berlin in 1921. Under the guidance of Richard von Mises he worked on various problems of potential theory as applied to electrical engineering, elasticity, and fluid flow. Under the influence of Erhard Schmidt he developed the central concept of his theory of orthogonal analytic functions which is now called the Bergman kernel. In 1930 Bergman was appointed *Privatdozent* simultaneously at the Institute of Mathematics and the Institute for Applied Mathematics which at that time was a rare distinction (cf. Poster 8). In 1933 he had to leave Berlin because of his Jewish ancestry. Initially he went to Tomsk (Soviet Union), where he had various students (Vekua, Fuks, Kufarev), but in 1937 he left the Soviet Union for France to escape from Stalinist pressure. In Paris he worked under most difficult conditions until in 1939, just before the outbreak of the Second World War, he left for the United States. Bergman worked at M.I.T. Brown University, and in 1952 became professor at Stanford University. At Stanford, he collab-

Stefan Bergman

orated with the other Berlin emigrant Menahem Max Schiffer. He died in 1977.

Bergman's discovery of the kernel function in response to a question of Erhard Schmidt was described by Menahem Max Schiffer in 1981: "Bergman participated in Schmidt's seminar and was charged to give a lecture on the development of arbitrary functions with finite square integrals in terms of an orthogonal set. As he told me, he misunderstood the task and instead of dealing with real functions over a real interval, he attacked the problem for analytic functions over a complex domain. He found the task hard but attacked it courageously and carried it through. This was the genesis of his famous theory of orthogonal functions and the kernel function." [Schi 1981; 6]

The function theorist Alexander Dinghas recalled in 1945 the support that he obtained from Bergman when he studied in Berlin in the early thirties: "Bergman also supported me with letters of recommendation and coupons for free meals (because in those days I was hard up privately) and because of this even brought me to Dean Mises". Later, in conversations with Dinghas, Erhard Schmidt called Bergman "a touching soul." [Ding 1945]

In 1938 Schiffer met Bergman in Paris, and later described this encounter as follows: "When I saw him in Paris in 1938, he was in a bad and almost hopeless situation. But he forgot about it when he began to talk about mathematics. He tried to convince me that the future of analysis lay in the field of several complex variables and urged me to work and publish in that direction." [Schi 1981; 9]

Bergman's problems of social and scientific adjustment in the U.S. are evidenced by a note of December 1945, sent by Dean Roland G.D. Richardson to President H. Wriston (both of Brown University, Providence): "His work is very recondite and his method of presentation so obscure that very few people can or will read it. Bergman is impossible as an undergraduate teacher and only with very advanced students is he really inspiring and useful. From the standpoint of research accomplished, he ... indeed has a touch of genius ... With all his desire to accomodate himself to his environment and his colleagues, he is alien and will never achieve any popular favor. ... He is not an applied mathematician though some of his ideas have very important connections with foremost problems in hydrodynamics ... I am not able to handle him. ... He will add scientific prestige to any group." [BUA]

President Wriston categorically declined a continuation of Bergman's appointment. It was only in 1952, at the age of 57, that he would finally get a professorship at Stanford University.

QA 377 .103

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By

STEFAN BERGMAN AND M. SCHIFFER

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Kernel Functions and Elliptic Differential Equations in Mathematical Physics; New York: Academic Press 1953

Hilda Geiringer (1893–1973)

The First Woman to Obtain a Venia Legendi in Applied Mathematics in Germany
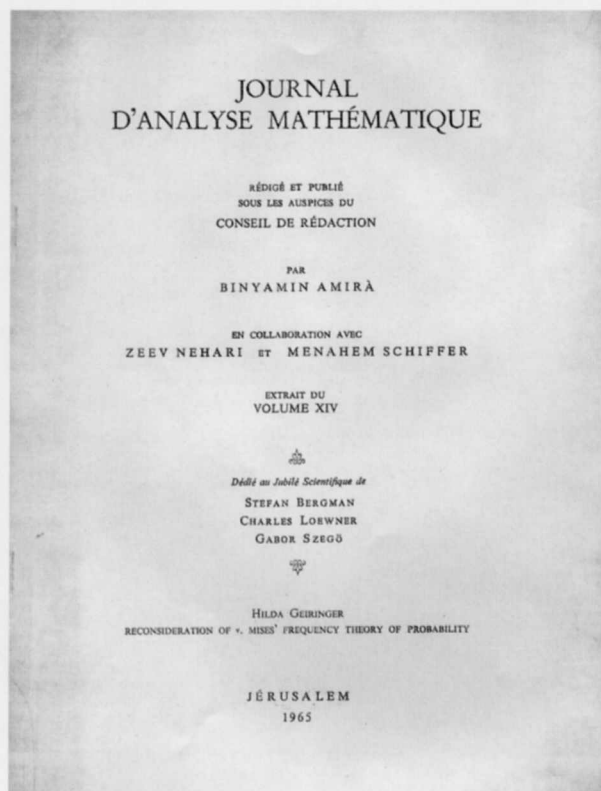

Hilda Geiringer

Hilda Geiringer was born in Vienna in 1893, and took her doctorate under Wilhelm Wirtinger (1865–1945) at the University of Vienna in 1917, with a thesis on Fourier series in two variables. Since truly applied mathematicians were rare in those days Richard von Mises appointed Geiringer 1921 as assistant at his institute although she was not especially trained in applied mathematics. From 1921 to 1923 she was married to the statistician Felix Pollaczek (see Poster 16). Although Geiringer's work in statistics and in plasticity was quite successful, she remained in the shadow of von Mises whom she admired. Her *Habilitation* was problematic for mathematical and, perhaps, other reasons. In the end Geiringer's *venia legendi* was restricted to applied mathematics [Sie 1993b] (See also Poster 7).

In December 1933 Geiringer was dismissed on grounds of the "Aryans clause" 3 of the Civil Service Law (see Poster 2). She followed Richard von Mises to Istanbul in the same year, and to the United States in 1940 where in 1943 she finally married him. In spite of support by Courant, Neyman, and other immigrants, she never obtained an appropriate position in the United States [Bin 1992]. After von Mises' death in 1953 she devoted her time almost exclusively to editing her husband's works, especially his "Mathematical Theory of Probability and Statistics" (1964). [Bin 1992], [Rich 1987], [Sie 1993b].

In late 1939, in fear of not getting an entrance permit to the United States, H. Geiringer wrote from Istanbul to Richard von Mises in the U.S.: "Is there no way to marry pro cura? Here an emigrant who has a resident's permit has married his 'bride' and she was then allowed to come to him straight from Vienna." [Mises Papers 2]

In April 1940, immediately after Hilda Geiringer had emigrated to the U.S, the Polish statistician J. Neyman (1894–1981), who had come to the U.S. via London, scientifically evaluated her as follows: "Whether she is to be considered outstanding in ability or not, depends on the standard of comparison. Among the present day mathematicians there are few, whose names undoubtedly will remain in the history of mathematics ... As for the newcomers in this country, I have not the slightest doubt that von Mises is one of the men of such caliber ... There will perhaps be a dozen or perhaps a score of such persons all over the world ... and Mrs. Geiringer does not belong in this category. But it may be reasonable to take another standard, that of an university professor of probability and statistics, perhaps an author of the now numerous books on statistical methods. In comparison with many of those people Mrs. Geiringer is an outstanding person and I think it would be in the interest of American science and instruction to keep her in some university." [Sie 1993b; 366]

This title page contains the names of no fewer than six mathematicians formerly in Berlin

Page 19: A letter of Hans Reissner (see Poster 17) to Hilda Geiringer discussing a problem about limits of relative frequencies.

Dr.-Ing. Dr.-Ing. e. h. H. REISSNER
ORDENTL. PROFESSOR DER MECHANIK
A. D. TECHNISCHEN HOCHSCHULE
BERLIN-CHARLOTTENBURG

28 Sept. 32

CHARLOTTENBURG 2
GROLMANSTR. 4
FERNRUF: STEINPL. 9251

Liebe Frau Doktor

Ihre freundliche Karte hat meine unverständigen Zweifel leider nicht behoben. Ich verstehe nicht, wie man von einem für alle Exemplare eines Kollektivs geltenden Grenzwert der relativen Häufigkeit sprechen darf, wenn der folgende Satz richtig ist:

"Für jede noch so grosse Zahl N der (N) ersten Glieder eines Kollektivexemplars giebt es Exemplare mit einer beliebig weit zwischen Null u. Eins von irgend einem Wert abweichenden relativer Häufigkeit eines Merkma

Sie machen nun die Bemerkung dass die in Axiom 1 postulierte Konvergenz keine gleichmässige sei u. dass sich dadurch die Schwierigkeiten der obigen Folgerung aufklären.

Das kann doch wohl nur bedeuten dass die Zahlen N die zu den Exemplaren (je einem Exemplar) eines Kollektivs gehören für eine noch so grosse Abweichung ε (der relat. Häufigkeit) zwischen 0 u. 1 vom Normalwert keine endliche obere Grenze haben.

Ist dies wirklich der Ausweg, dann ist für mein Verständnis damit das erste Axiom inhaltlos.

Mit bestem Gruss

Ihr H. Reissner

Heute kam eine
Karte von Levi-Civita.

FREIE UNIVERSITÄT BERLIN

MITTEILUNGEN FÜR DOZENTEN UND STUDENTEN

NUMMER EINHUNDERTUNDZWEI

1. MAI 1965

Rektor und Senat

Professor Dr. Ernst E. Jacobsthal †

In Überlingen am Bodensee verstarb am 7. Februar 1965 der Mathematiker Professor Dr. Ernst E. Jacobsthal im 83. Lebensjahr. Er war der erste Ehrenbürger der Freien Universität Berlin.

Professor Jacobsthal, 1882 in Berlin geboren, hatte 1906 an der alten Berliner Friedrich-Wilhelms-Universität promoviert und war bis 1934 ao. Professor der Technischen Hochschule in Charlottenburg, der jetzigen Technischen Universität.

1934 verließ er Deutschland und ging nach Norwegen, wo er bis zu seiner Emeritierung eine Professur an der Norwegischen Technischen Hochschule in Trondheim inne hatte. Außerdem war er Mitglied der Akademie von Trondheim.

Nach Gründung der Freien Universität Berlin im Wintersemester 1948/49 war es Professor Jacobsthal ein großes Anliegen, überall in den skandinavischen Ländern für die Sache unserer jungen Universität einzutreten. Außerdem weilte er regelmäßig zu Gastvorlesungen in Berlin. Er hat die Entwicklung des mathematischen Unterrichts an der Freien Universität maßgeblich beeinflußt.

Aus diesem Anlaß wurde ihm zu seinem 70. Geburtstag, am 16. Oktober 1952, von der Freien Universität Berlin die Würde eines Ehrenbürgers verliehen. Es war die erste Würdigung dieser Art. In der Urkunde hieß es u. a.:

»Die Freie Universität Berlin gedenkt des hervorragenden Mathematikers und akademischen Lehrers, der sein Wissen und seine Persönlichkeit in regelmäßigen Gastvorlesungen auch ihrer akademischen Jugend zur Verfügung gestellt hat, und sie gedenkt mit besonderem Dank des warmherzigen Freundes, der in weitesten Kreisen durch Wort und Tat für ihren Aufstieg und ihr Ansehen gewirkt hat.«

Der Akademische Senat hat beschlossen, vom Wintersemester 1965/66 an die Vorlesungszeiten für das Wintersemester vom

15. Oktober bis 14. Februar

und für das Sommersemester vom

15. April bis 14. Juli

festzusetzen.

Die Bewerbungsfristen für die Zulassung zum Studium an der Freien Universität wurden wie folgt neu festgelegt:

1. bis 30. Juni für das Wintersemester

2. bis 31. Januar für das Sommersemester.

Die feierliche Immatrikulation der zum Sommersemester 1965 neu zugelassenen Studenten findet am 28. Mai, 10 Uhr c. t. im Auditorium maximum statt.

Obituary to E. Jacobsthal

Ernst Jacobsthal (1882–1965)

A Pure Mathematician at the Technische Hochschule Charlottenburg

Ernst Jacobsthal, born in Berlin in 1882, was a very versatile mathematician. As student of Georg Frobenius (1849–1917) his main scientific interest was in algebra and number theory. As a theoretically oriented mathematician he was badly needed at the Technische Hochschule for the basic training of engineers and especially for the relatively new duty of teacher training. Nevertheless, his field was not central for the main tasks of the Technische Hochschule; so he could not obtain more than an unpaid associate professorship in 1922. At that time Jacobsthal was officially employed and paid as teacher at a *Gymnasium*, even though he didn't continue this occupation anymore, by ministerial agreement. In April 1934 the Nazis among the professors at the Technische Hochschule demanded that Jacobsthal be sent back to the high school. At that time the mathematician Rudolf Rothe was the Head of the Faculty for General Sciences (see Poster 4). He protested and referred to Jacobsthal's importance for conducting the mathematical course for engineers. The suggestion by Rothe to pension off Jacobsthal as teacher and to have him continue his (unpaid) lectures at the Technische Hochschule was not backed up by Rothe's successor, the Nazi Storm. Instead, Jacobsthal was indeed dismissed as a teacher "at his own request" and at the same time expelled from the Technische Hochschule

G. Pólya, W. Jacobsthal (back)
E. Jacobsthal, Mrs W. Jacobsthal,
G. Hamel (front)

John von Neumann
(1903–1957)

in accordance with clause 6 of the Civil Service Law (see Poster 1/2). He went to Trondheim (Norway) where he worked as a professor until his retirement, interrupted only by a temporary escape to Sweden during the German occupation (1943–1945). After the war Jacobsthal stepped into the process of "overcoming the past" in Germany and in 1952 he became the first "honorary citizen" of the Freie Universität Berlin which had been founded in 1948 (see also Poster 25). [Sel 1965]

Dean Rudolf Rothe wrote on April 23, 1934, to the Ministerialrat Theodor Vahlen on behalf of Jacobsthal: "It is not clear to me as yet what the ministry actually intended with his dismissal from the Technische Hochschule. E. Jacobsthal is indeed of Jewish descent but as he was already hired before 1914, the Civil Service Law does not apply to him. It would mean a lot to us if he could remain at the Technische Hochschule. By the way he is a Senior Fellow of the *Mathematische Gesellschaft* ... " [GSA 2, fol 172]

From a letter Jacobsthal sent to the Julius Springer Verlag in 1950: "In 1950 the Springer Verlag published a book by Mr. Wilhelm Blaschke, entitled 'Einführung in die Differentialgeometrie'. ... Mr. Blaschke cannot give up his Nazi methods. ... He quotes mathematicians of Jewish descent as 'Jewish', whereas he refers to other mathematicians of non–Jewish descent only with their name and without mention of their nationality. This is obviously a biased attitude, which is inexcusable in the Germany of 1950. Even the addition of 'outstanding' does not lessen the intention which Blaschke pursues with such quotations." Springer acted immediately and cancelled Blaschke's collaboration with the series *Grundlehren der Mathematik*. [September 17, 1950, van der Waerden Papers]

Born in Budapest, in 1903, John von Neumann was an admired child prodigy. He studied mathematics, physics, and chemistry in Berlin and Zürich, and by 1927 was already a *Privatdozent* for mathematics at the University of Berlin. In Berlin he was primarily influenced by Erhard Schmidt — notably in his work on the foundations of Quantum Mechanics.

John von Neumann

Between 1930 and 1933 he worked alternately in Princeton and Berlin. On February 12, 1933, von Neumann officially resigned from his *Privatdozentur* in Berlin, effective as of the winter term 1933/34. Soon afterwards he also dropped his plan to lecture in Berlin in the summer of 1933.

DIE GRUNDLEHREN DER

MATHEMATISCHEN WISSENSCHAFTEN

IN EINZELDARSTELLUNGEN MIT BESONDERER
BERÜCKSICHTIGUNG DER ANWENDUNGSGEBIETE

GEMEINSAM MIT

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HERAUSGEGEBEN VON
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GÖTTINGEN

BAND XXXVIII
MATHEMATISCHE GRUNDLAGEN
DER QUANTENMECHANIK
VON
JOHANN V. NEUMANN

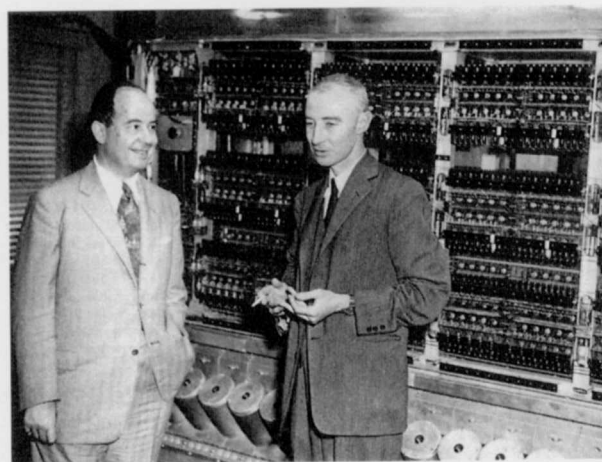BERLIN
VERLAG VON JULIUS SPRINGER
1932

John von Neumann's mathematical work is outstanding both in its versatility and its impact on other sciences such as physics and economics. His contributions to functional analysis and operator theory, mathematical physics and game theory are still influential in various recent research developments. He became famous beyond the academic world for his design of one of the first modern computers and for his influential role in the development of the strategy of deterrence. [UL 1958], [Hal 1979]

Stanislaw Ulam writes in his autobiography of his friend von Neumann: "In the German universities the number of existing and prospective vacancies for professorships was extremely small — something like two or three in the entire country for the next two years. With his typical rational approach, von Neumann computed that the expected number of professorial appointments within three years was three,

whereas the number of docents was forty. This is what had made him decide to emigrate, not to mention the worsening political situation, which made him feel that unhampered intellectual pursuits would become difficult. In 1930, he accepted an offer of a visiting professorship at Princeton University, and, in 1933, shortly after the creation of the Institute, he was invited to become the youngest member of the permanent faculty of the Institute for Advanced Studies." [Ul 1976; 68/69]

Von Neumann revealed in letters which he wrote in early 1933 that a complete separation from the German mathematical culture was difficult for him and that he actually would have liked to keep his teaching position at the University of Berlin. On March 19, 1933, he wrote from Budapest to Veblen in Princeton: "On the way to Budapest, we stopped on Febr. 7/8 for 36 hours in Berlin. I met E. Schmidt and I. Schur there. The effects of the political changes where not yet to be felt explicitly then, for instance the new 'Nazi' minister of education (Mr. Rust) was only 24 hours in office, and nobody new exactly, what he would do. People felt very uncertain then, but not too pessimistic. So I decided, to act as I intended, when we talked over it in Princeton: to resign immediately, but to give lectures in this summer–term. The newer German developments make me doubt, wether this is reasonable, and if [it] would not be better to cancel my german lectures altogether." [Veblen Papers 1]

On April 30, 1933, right after the Civil Service Law (see Poster 1/2) was passed, von Neumann writes with resignation to Oswald Veblen: "I have to see Berlin and Göttingen once more — although an expedition to the North Pole would be a much nicer thing under the present conditions." [loc.cit.]

John von Neumann and Robert J. Oppenheimer in front of the IAS computer, 1952

The young Issai Schur

6. Schur's school in Berlin

There is no obvious way in which the "school" of a mathematician can be defined. In contrast to many sciences, little or no team work is involved in mathematics apart from some joint papers, usually written by two authors.

I think a simple but rather narrow definition of "school" would be to restrict membership to those who took their Ph.D. under Schur's guidance. This is only a first approximation; for there are mathematicians who went to Schur's lectures and seminars in Berlin and were strongly influenced by him although they did not become his doctoral students.

Fortunately, the editors of Schur's Collected Works have appended a list of Schur's Ph.D. students together with the titles of their dissertations. There are 22 persons who completed their dissertations under Schur, covering the period 1917 to 1936, and 6 others who started under Schur but did not complete their work until after Schur's dismissal in 1936.

Schur's Ph.D. students

1917	Maria VERBEEK		1928	Arnold SCHOLZ
1921	Heinz PRÜFER		1931	Robert FRUCHT
1921	Arthur COHN		1932	Wilhelm SPECHT
1922	Dora PRÖLSZ		1932	Bernhard NEUMANN
1922	Felix POLLACZEK		1932	Hans ROHRBACH
1923	Maximilian HERZBERGER		1933	Richard RADO
1924	Hildegard ILLE		1933	Wolfgang HAHN
1925	Karl DÖRGE		1935	Helmut WIELANDT
1926	Richard BRAUER		1935	Karl MOLSEN
1928	Udo WEGNER		1936	Rose PELTESOHN
1928	Alfred BRAUER		1936	Feodor THEILHEIMER

[Quoted with the publisher's permission from ISSAI SCHUR, *Gesammelte Abhandlungen* (Edited by Alfred Brauer and Hans Rohrbach), Vol. III (Springer-Verlag, Berlin, 1973), pp. 479–480.]

The School of Issai Schur

Until 1933 the algebraic school of Issai Schur (1875–1941) at the University of Berlin was, without any doubt, the single most coherent and influential group of mathematicians in Berlin and among the most important in all of Germany. Inspired by a charismatic leader, it centered around Schur's research on group representations, which was extended by his students in various directions (soluble groups, combinatorics, matrix theory). [Cha/Mag 1982] Eleven out of the 44 exiled Berlin mathematicians were Schur's students. Several of them (Pollaczek, Schiffer, and Theilheimer) later turned to more applied fields, partly influenced by the deep connections of Schur's work with mathematical physics. Another student, Robert Frucht, went to Italy already in 1930 for economic reasons, and had to move again, this time to Chile, when the racial laws came into effect in Italy in 1938; Frucht became a noted graph theorist [Fru 1982].

The fate of several others of Schur's students (Arthur Cohn, Rose Peltesohn) is still unclear. Leading mathematicians outside Berlin like Hermann Weyl in Göttingen and Richard Brauer, who had left Berlin for Königsberg in 1925, were strongly influenced by Schur. Nevertheless, the work of Schur's group was somewhat overshadowed in its international recognition by the more abstract school around Emmy Noether in Göttingen, but their ideas merged in the subsequent developement of the field. [Led 1983], [Bier 1988], [Fe 1980], [Schi 1986], [Jes 1993], [Ding 1945]

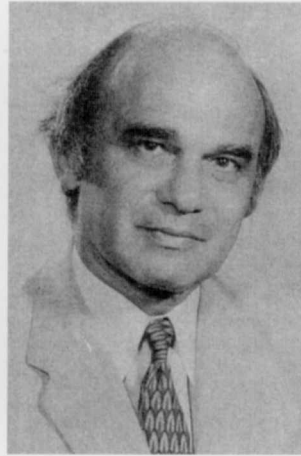## Emigrated Students of Issai Schur

Alfred Brauer

Alfred Brauer (1894–1985), brother of the younger but better known Richard Brauer, was one of the organizers of the *Mathematisch–Physikalische Arbeitsgemeinschaft (Mapha)* until 1933; he also took
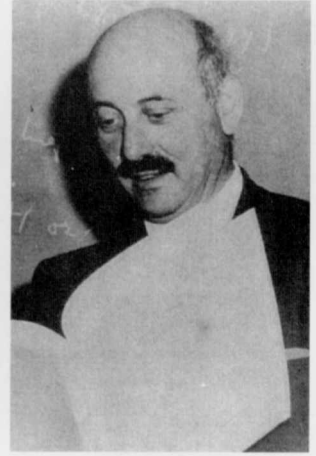
| Käte Sperling–Fenchel | Kurt August Hirsch | Walter Ledermann | Bernhard Neumann |

care of the library at the mathematical institute. He was dismissed as a *Privatdozent* in 1935 and left for the United States in 1938. There he became an assistant to Hermann Weyl at the Institute for Advanced Study, and his experience with the mathematical library in Berlin became valuable for the building of the Institute's new library. Eventually, he became a professor at the University of North Carolina at Chapel Hill. He worked extensively on characteristic roots of matrices and co–edited Schur's "Gesammelte Abhandlungen" in 1973. [Roh 1988] In a letter of Hermann Weyl to Paul Bernays from 1940 we read: "Alfred Brauer is my assistant, and he is proving very helpful in the building up of a new library ... in our new quarters called Fuld Hall." [Weyl Papers]

Käte Fenchel (born Sperling, 1905–1983) was Schur's student from 1924 to 1928. She finished her studies with a *Staatsexamen* (high school teacher's diploma), since she could not afford to continue her studies. In 1933 she was dismissed as a teacher and was forced to emigrate to Denmark (see Posters 18 and 21). [Hoy 1987]

Kurt August Hirsch (1906–1986) was Schur's student although eventually he chose a dissertation on the foundations of mathematics which was supervised by Bieberbach (1933). In order to earn a living Hirsch went into journalism around 1930. He started writing about mathematical or philosophical matters in one of the oldest daily papers in Europe, the *Vossische Zeitung.* When the newspaper folded up in March 1934, Hirsch went to Cambridge, England. He returned to algebra there and made seminal contributions to the theory of soluble groups. In 1951, he moved to the University of London where he built an important centre for group theory. (See Poster 24) [Hir 1986] [Gru 1988]

Walter Ledermann (born 1911) completed a *Staatsexamen* in November 1933 "with Issai Schur as examiner and L. Bieberbach (in Nazi uniform) as co-examiner." [letter 1] In early 1934 he obtained a scholarship to St.Andrews in Scotland through the *International Student Service (Weltstudentenwerk).* In 1936 he received his Ph.D. under H.W. Turnbull. He held teaching appointments at various British universities and retired from Sussex in 1978. His mathematical research interests include matrix theory, statistics, and homological algebra among others; like his teacher Schur he always preferred concrete problems. He has written an authoritative historical report on the "Schur School" [Led 1983], [Gai/Laf 1985], [letter 1]

Bernhard Neumann (born 1909) took his doctorate with Schur in 1932. He had to leave Berlin in 1933 and earned a second doctorate in Cambridge (England) under the supervision of Philip Hall. Together with his wife Hanna (born von Caemmerer, see below) he went to Australia in 1962 to build a modern mathematical institute in Canberra. He made important contributions to modern combinatorial group theory, especially in the area of free products of groups and embedding theory. In 1992 he was awarded an honorary doctorate by the Humboldt–Universität Berlin. [Pi/Fu 1973]

Hanna Neumann (born von Caemmerer, 1914–1971) completed her teachers diploma in 1936. She left Berlin first for Göttingen and in 1938 went to Cambridge (England) to marry Bernhard Neumann (see Poster 20). She was mother to five children, among them the well–known mathematicians Peter and Walter D. Neumann. Her publications include the monograph *Varieties of Groups* (1967). [New/Wa 1974]

Hanna Neumann   Felix Pollaczek   Richard Rado   Menahem Max Schiffer

Rose Peltesohn (born 1913) was one of the last doctorate students of Schur's (1936), working on the combinatorial question "Das Turnierproblem für Spiele zu je dreien". Before emigrating to Palestine in 1938 she wrote another paper on an algebraic subject, published in Compositio Mathematica. Her two papers have attracted considerable attention during several decades. Peltesohn is now living in Tel Aviv. [Pi/Fu 1973]

Felix Pollaczek (1892–1981) received his doctorate from Schur in 1922. He left academic life to join the industrial company AEG. In 1923 he became scientific adviser at the *Reichspost–Zentralamt* in Berlin. Pollaczek made important contributions to stochastics (queueing theory) and applied mathematics. He escaped to southern France in 1933 and managed to survive with the help of French peasants. (See Poster 16) [Schrei/LeGall 1993]

Richard Rado (1906–1989) went to England in 1933 immediately after receiving his doctorate from Schur and earned a second Ph.D. under G.H. Hardy in Cambridge in 1935. In 1954 he became a professor at the University of Reading (England). Rado had extremely wide mathematical interests. His most important work is in combinatorics, partly in cooperation with Paul Erdős. In 1981 Rado received an honorary doctorate from the Freie Universität Berlin, and in 1998 the Fachgruppe Diskrete Mathematik der DMV set up an annual Rado Prize for talented young mathematicians. [Rog 1991]

Menahem Max Schiffer (1911–1997) was originally a student of physics (with Schrödinger) and turned to algebra and invariant theory under the influence of Schur. In 1933 he could not submit his dissertation (a paper which "Schur liked very much") because Schur was then (temporarily) dismissed. Instead he was offered a scholarship to the Hebrew University in Jerusalem by an official of the English–Jewish Emergency Council, whom he met by chance in Schur's home. Schiffer later changed his field of interest to Riemann surfaces and differential equations. In 1946 he went to the United States and became an influential mathematician at Stanford University. [Schi 1986]

The ordeal of Issai Schur (1875–1941)

Of all professors of mathematics Issai Schur had the oldest connections to the University. Schur had been a student of the famous algebraist Georg Frobenius (1849–1917) and was admitted as a *Privatdozent* in 1903. He was born in Mogilev on the Dniepr, but he spoke German so perfectly that no one could guess that it was not his native language. His emotional ties to Germany were so strong, that when the Nazis came to power in 1933, he declined many cordial invitations to continue his life and work in the United States or in Britain. He endured six years of persecution and humiliation under the Nazis. Eventually, in order to be allowed to leave the country, he even had to find a sponsor to pay the *Reichsflucht-steuer* (Reichs flight tax). A sick man in body and spirit, he finally reached Palestine and died there two years later on his 66th birthday on January 10, 1941. [Bra 1973]

Walter Ledermann describes Schur's teaching: "Schur was a superb lecturer. His lectures were meticulously prepared. ... (and) were exceedingly popular. I remember attending his algebra course which was held in a lecture theatre filled with about 400 students. Sometimes, when I had to be content with a seat at the back of the lecture theatre, I used a pair of opera glasses to get at least a glimpse of the speaker." [Led 1983; 105]

_J. A._

_M._   PREUSSISCHE AKADEMIE DER WISSENSCHAFTEN

> Eingegangen
> 1. APR. 1938
> Erledigt _____

Zirkular

betr. _Weierstraß – Ausgabe_

An die Mitglieder der Akademie

HH.

[handwritten signatures and notes]

Die HH. Mitglieder werden gebeten, dieses Zirkular möglichst umgehend zu erledigen und in der oben angegebenen Reihenfolge weiterzubefördern; das zuletzt verzeichnete Mitglied wolle es an das Bureau der Akademie einsenden.

Abgestempelte Umschläge für die Versendung sind beigefügt.

Signatures on a Circular (concerning an edition of the works of Weierstraß, 1938)
Schmidt: "seen" (dated March 11)
Schur: "seen" (dated March 12)
Bieberbach: "I find it surprising that Jews are still members of academic commissions." (dated March 29)
Vahlen: "I propose modification." (dated March 30)
Planck [who was Secretary of the Academy]: "I will take care of it." (dated April 4)

His dismissal caused vehement reactions among students and colleagues: "When Schur's lectures were cancelled (in 1933) there was an outcry among the students and professors, for Schur was respected and very well liked. The next day Erhard Schmidt started his lecture with a protest against this dismissal and even Bieberbach, who later made himself a shameful reputation as a Nazi, came out in Schur's defense. Schur went on quietly with his work on algebra at home." (Posters 1/2), [Schi 1986]
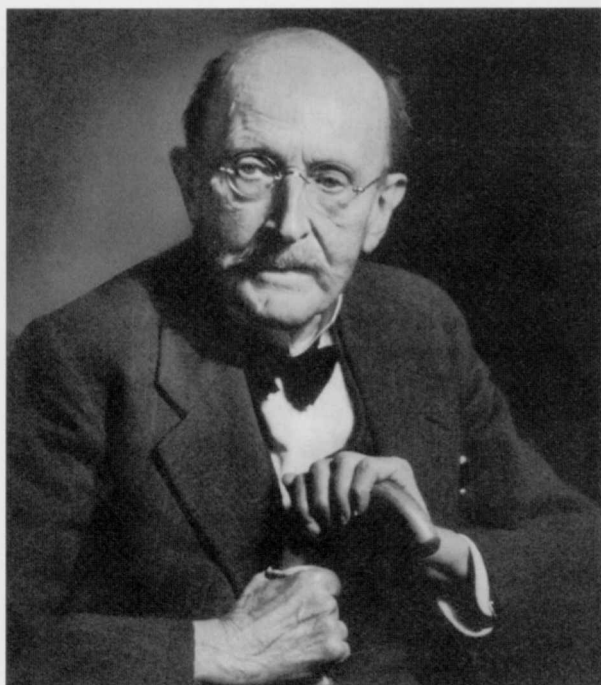
The aged Max Planck, Secretary of the Preußische Akademie der Wissenschaften, did not resist the pressure to comply with the Nazi bureaucracy.

In 1938 Schur was pressed to resign from the Prussian Academy of Sciences*. On April 7, Schur resigned "voluntarily" from the Commissions of the Academy [Sie 1993a; 122]. Half a year later he had to resign from the Academy altogether. [MaPl 1998]

After his dismissal, he was not even allowed to use the library. Alfred Brauer remembers: "When Landau died in February 1938, Schur was supposed to give an address at his funeral. For that reason he was in need of some mathematical details from the literature. He asked me to help him in this matter. Of course I was not allowed to use the library of the mathematical institute which I had built up over many years. Finally I got an exemption for a week and could use the library of the Prussian Staatsbibliothek for a fee. ... So I could answer at least some of Schur's questions." [Bra 1973, VII]

* see page 26

Staatsbibliothek 1937

Schur's students, e.g. v. Caemmerer, Rohrbach and Wielandt, were loyal to him (see Poster 20). Hans Rohrbach, for instance, wrote to Richard von Mises in Turkey to remind him about Schur's sixtieth birthday in 1935 [Mises Papers 3]. This was in contrast to most of Schur's former colleagues at the University, as Schiffer recalls: "Schur told me that the only person at the Mathematical Institute in Berlin who was kind to him was Grunsky, then a young lecturer. Long after the war, I talked to Grunsky about that remark and he literally started to cry: 'You know what I did? I sent him a postcard to congratulate him on his sixtieth birthday. I admired him so much and was very respectful in that card. How lonely he must have been to remember such a small thing.'" [Schi 1986]

Issai Schur

A remark by Alfred Brauer sheds light on Schur's situation after he finally had left the country: "When Schur could not sleep at night, he read the *Jahrbuch über die Fortschritte der Mathematik*. When he came to Palestine and was forced to offer his library for sale to the Institute for Advanced Study in Princeton for financial reason, he finally excluded the Jahrbuch in a telegraph only few weeks before his death." [Bra 1973, XIII]

The tomb of Issai Schur and his wife Regina in a cemetry at Tel Aviv

Feodor Theilheimer
Schur's last student
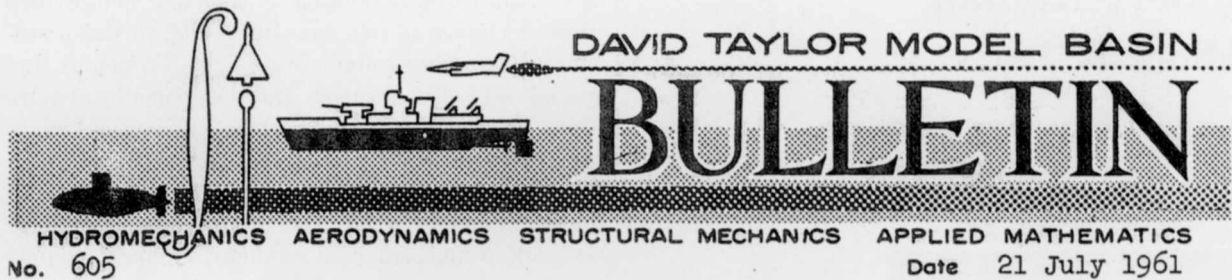
Feodor Theilheimer was born in Gunzenhausen (Bavaria) on June 18, 1909. After one year at the University of Erlangen, he pursued rabbinical studies for two years, from 1929 to 1931. In 1931, he entered the University of Berlin and studied mainly with Schur and Schmidt. Upon completion of his Ph.D. in mathematics, in the spring of 1936, he was not permitted to seek adequate academic employment. He therefore went to the United States in November 1937, supported by his brother who had emigrated several years earlier. Theilheimer was sent to St. Louis by an organization caring for Jewish refugees, and there he taught Jewish subjects from 1938 until 1941. He found re–entry into mathematics through programs for applied mathematics at Chicago and Brown University. During his later career he was employed by the U.S. Department of Defense from 1948 to 1977. His work was important in the development of spline functions and their use in engineering applications. After his retirement he taught mathematics courses at the University of Maryland until 1983. [letter 2]

Amtliche Vermerke
(Fakultätswechsel, Prüfungen usw.)

Als Nichtarier zugelassen innerhalb der durch den Erlaß U I 1331 festgesetzten Prozentzahlen.

Abgangszeugnis

Inhaber hat unserer Universität bis zum Ende des Sommer=Semesters 1935 angehört.

Über die Führung ist Nachteiliges nicht bekannt geworden.

Wegen Nichtannahme von Vorlesungen gelöscht am 24.1.36

Berlin, den 18. MÄRZ 1936

Der Rektor
der Universität

Das Universitäts=
Sekretariat

Feodor Theilheimers diploma with the remark:
"Admitted as a Non–Aryan within the percentage according to decree U I 1331".

DAVID TAYLOR MODEL BASIN
BULLETIN

HYDROMECHANICS AERODYNAMICS STRUCTURAL MECHANICS APPLIED MATHEMATICS

No. 605   Date 21 July 1961

DRS. PIEN AND THEILHEIMER PRESENTED WITH
AWARDS FOR SCIENTIFIC ACHIEVEMENT

During a ceremony held on 13 July 1961 in the presence of the Management Council, Captain J. A. Obermeyer, Commanding Officer and Director, announced that Drs. Pao Pien and Feodor Theilheimer have been selected as the first recipients of the David W. Taylor Award for Scientific Achievement. Dr. Theilheimer was present to receive the award letter and citation. Dr. Pien had departed for Japan to attend the University of Tokyo on a National Science Foundation Scholarship and his award will be forwarded to him.

Dr. Feodor Theilheimer. By developing a mathematical technique for calculating ship profiles with the use of a high speed calculator, you have made it practical for the first time to calculate ship profiles automatically. Your methods have been tested on several Navy vessels and the results obtained have proved their feasibility. They will have a profound impact on the design of ships in the future, making possible a systematic approach to the study of more complex ship design problems as a function of specific mathematical parameters. For this outstanding accomplishment you richly deserve the David W. Taylor Award for Scientific Achievement.

Feodor Theilheimer receives the David Taylor Model Basin Award for Scientific Achievement (1962)

Robert Remak (1888–1942)

A Non–Conformist in a Fatal Environment

Robert Remak

Remak's grandfather Robert Remak (1815–1865), a famous physician and physiologist at the University of Berlin, was one of the first (and very few) Jews in Prussia to be appointed as professor before 1918 without change of religion. His grandson was a student of the Berlin algebraist Georg Frobenius and specialized in group theory and the geometry of numbers. Remak's dissertation from 1911 was significant for the decomposition of finite groups into a direct product of irreducible factors ("Wedderburn–Remak–Schmidt–Krull" Theorem). As shown by his work in mathematical economics Remak pursued widespread interests; he is indeed regarded by some as a precursor of activity analysis. But his unwillingness to compromise in intellectual respects, and his lack of smoothness in social interactions prevented his promotion at the University. Dismissed in 1933 because he was Jewish, Remak became active in a private circle of Berlin mathematicians which undertook to study the new kind of algebra presented in van der Waerden's book [Hir 1986]. After the *Kristallnacht* Pogrom of 1938 Remak was taken to the concentration camp Sachsenhausen near Berlin for eight weeks. After that nightmare, he and his wife tried in vain to obtain an affidavit for emigration to the United States.

The lack of formal social distinction before 1933 played against Remak. He fled to the Netherlands in 1939 and in 1942 was captured by the German occupants and sent to Auschwitz; this caused his death.

Prisoners of the concentration camp Sachsenhausen where Remak was kept for eight weeks in 1938.

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Received at Lower Pyne Bldg., Princeton, N. J.   1938 NOV 19 PM 3 35

NG320 CABLE VIA RCA=CD BERLIN 11435 38 19   (HW) Remak

NLT PROFESSOR HERMANN WEYL UNIVERSITY=

PRINCETONNJ=

BITTE VERHELFEN SIE MEINEM MANNE ROBERT REMAK UND MIR ZUR
AUSWANDERUNG DIE NUNMEHR DRINGEND NOTWENDIG ICH BIN SEIT
NEUM TAGEN ALLEIN UND SEHR VERZWEIFELT BITTE SCHICKEN SIE
AFFIDAVITS FUER UNS=
HERTHA REMAK.
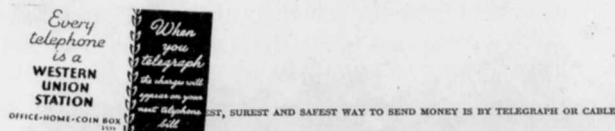
Mrs. Herta Remak asks Hermann Weyl, Princeton, for support

Miszellen. Chronik. Statistik.   703

Miszellen. Chronik. Statistik.

XXI.

Kann die Volkswirtschaftslehre eine exakte Wissenschaft werden?

Von Robert Remak, Berlin.

Mit 6 Abbildungen im Text.

Inhalt: I. Einleitende Bemerkungen. II. Der wirtschaftliche Phasenraum. III. Die superponierten Preissysteme. IV. Schlußbemerkungen.

I. Einleitende Bemerkungen.

Ich bemerke vorweg, daß ich nicht Volkswirtschaftler, sondern Mathematiker bin. Es kann daher nicht meine Aufgabe sein, Aussagen über volkswirtschaftliche Dinge zu machen, sondern ich sehe meine Aufgabe nur darin, Fragen zu stellen und Schlüsse, die man bisher für selbstverständlich gehalten haben mag, auf ihre Stichhaltigkeit zu prüfen. Der Leser darf sich auch nicht wundern, wenn ich von vielen Fragen sage, daß wir über sie nichts wissen, wenn darüber vielleicht begründete wissenschaftliche Lehrmeinungen oder Erfahrungsgesetze vorliegen. Als exakt richtig kann man nur ansehen, was sich durch physische Beobachtung, Zählung und Rechnung ermitteln läßt, Tatsachen, die auf dem Einmaleins beruhen und die gleiche Sicherheit haben wie das Einmaleins. Ueber Fragen, bei denen zwischen politischen oder wissenschaftlichen Gegnern Meinungsverschiedenheiten möglich sind, wissen wir hiernach nichts. Derartige Meinungsverschiedenheiten kommen entweder daher, daß die Tatsachen statistisch oder rechnerisch ungenügend erforscht sind, oder es handelt sich dabei nicht um Tatsachen, sondern um das, was geschehen soll, wofür tatsächlich verschiedene Möglichkeiten vorliegen können. Die Aufgabe der exakten Forschung wäre es in diesem Falle, die verschiedenen Möglichkeiten aufzuzeigen. Ein volkswirtschaftliches Gesetz von der Art wie etwa: „Wenn die Ware knapp wird, steigen die Preise" enthält gleichsam als Atom das absolut egoistische Individuum, das jeden Preis nimmt, den es bekommen kann. Derartige Gesetze sind also Gesetze der Dynamik des wirtschaftlichen Kampfes. Gegenüber der Frage, ob dieser wirtschaftliche Kampf überhaupt zweckmäßig ist, besagen sie ebensowenig etwas, wie eine theoretische oder erfahrungsmäßig begründete Dynamik des Stellungs- oder Bewegungskrieges ein Argument ist gegen-

Remak's essay of 1929

Remak promoted mathematical modeling in economics and sociology. In the essay "Can economics become an exact science?" of 1929 he also foresees the importance of using computers in this field: "I emphasize, … that I have not made any politico–economical statements, but only stated problems and indicated some calculational schemes, … that it is still open as to if the outcome of the computation favours capitalism, socialism, or communism. … These equations are very awkward to handle mathematically. There is, however, work in progress concerning the numerical solution of linear equations with several unknowns using electric circuits." [Rem 1929; 734]

Issai Schur wrote on Juli 10, 1936 in a report on Remak: "I consider Dr. Robert Remak to be an outstanding researcher, who is distinguished by his versatility, originality, strength, and brilliancy. … He may, without doubt, be called a leading scholar in the splendid and important field of geometry of numbers." [Veblen Papers 2]

In the occupied Amsterdam, Remak may have lost protection as a result of his non–Jewish wife's decision to divorce him. (The case of Grelling , however, shows that being married to a non–Jewish person was by no means a guarantee of safety, see Poster 15). Obviously Remak's incautious behaviour in Amsterdam put him under additional threat. Hans Freudenthal, who had studied in Berlin, but went to Amsterdam in 1931, wrote to topologist Heinz Hopf in Zürich on March 7, 1940: "My main problem is Remak, who is not satisfied with visiting my lectures but who also gives us no end of trouble. It mostly concerns conflicts with his landlords, who then immediately run to the alien registration office. … also Remaks expression 'then I'd rather go to a concentration camp' has infuriated enough people already. The matter is extremely serious; it is doubtful as to how long we can still prevent him from being expelled (to

Germany). ... It is understandable that his wife didn't want to come here, but demonstrates a lack of loyalty to him." [Freudenthal Papers 1]

Freudenthal lived underground during the Nazi occupation of Amsterdam. After the war, on July 28, 1945, he wrote again to Heinz Hopf: "Wolff and Belinfante aren't ever going to come back. The same goes for Remak and Blumenthal. Remak has been betrayed by his wife. Had she not divorced him, then he could have stayed here." [Freudenthal Papers 2]
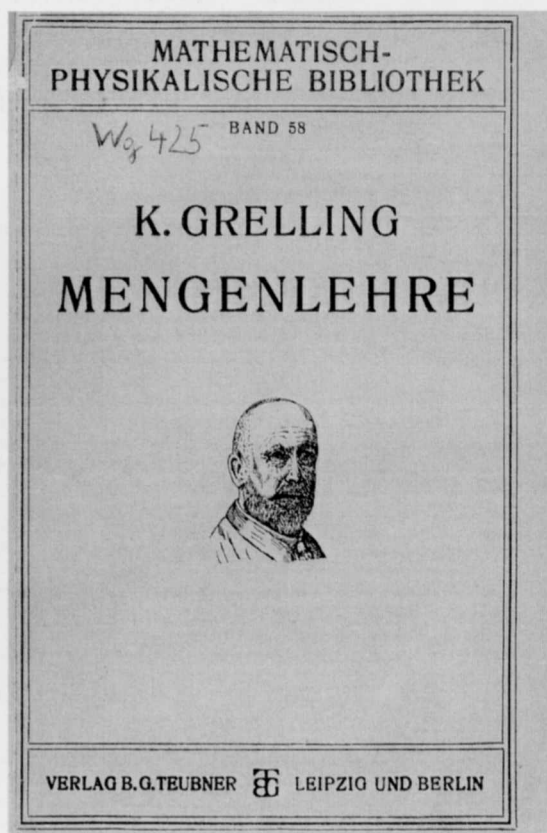

Hans Freudenthal

In a recent article on Robert Remak, Uta Merzbach summarizes: "His refusal — in mathematics and everyday affairs — to compromise, or to be 'realistic', swept him out of the mainstream of mathematics and cost him his life." [Mer 1992; 514]

Kurt Grelling (1886–1942)

Logician and Socialist

Kurt Grelling was born in 1886 in Berlin. He was the son of the Jewish lawyer and co–founder of the *Deutsche Friedensgesellschaft* (German Peace Association) Richard Grelling (1853–1929) who converted to christianity. Grelling studied in Berlin and Göttingen, among other things mathematics, physics and philosophy, and graduated in 1910 under Ernst Zermelo in Göttingen with a thesis *Die Axiome der Arithmetik unter besonderer Berücksichtigung der Beziehungen zur Mengenlehre*. In 1908, before his graduation, he and the philosopher Leonard Nelson (Göttingen) wrote the famous article *Bemerkungen zu den Paradoxien von Russell und Burali–Forti*, which for the first time contained the so–called heterological or "Grellingsche" antinomy and a thorough analysis of the different attempts to resolve the antinomies of set theory so far.

Between 1911 and 1914 Grelling was in charge of the column "Philosophy" in the review section of the *Sozialistische Monatshefte* (Socialist Monthly Magazine). In 1919 he took part as a delegate in the SPD party convention in Weimar. Because of family reasons he had to adopt the profession of school teacher, a profession in which he earned just enough to live on. In 1923 he was given a permanent position as teacher at the *Walter–Rathenau–Oberrealschule* in Berlin–Neukölln. Since 1926 Grelling participated in Hans Reichenbach's philosophical seminars at the University, and belonged to the *Gesellschaft für empirische Philosophie* (Association for Empirical Philosophy) in Berlin, see Poster 19. In April 1933, Grelling was dismissed from the school system in accordance with the Civil Service Law. Because he had been active during the First World War, the "Aryan Article" 3 could not be applied; so Article 6 was used instead (see Posters 1/2). Paradoxically, in spite of daily oppression, Grelling now again found time for intensive scientific work because he had inherited some money. Under the impression of the *Kristallnacht* Pogrom he didn't return from a visit to Belgium in 1938. In May 1940, after German troops had begun to attack, he was deported by the Belgians to France, where he was interned in camps in southern France. He could not accept the offer of an Associate Professorship, at the New School for Social Research in New York, in January 1941 because of the restrictive entry conditions in the United States, and probably also because of

MATHEMATISCH-
PHYSIKALISCHE BIBLIOTHEK

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K. GRELLING

MENGENLEHRE

VERLAG B.G.TEUBNER   LEIPZIG UND BERLIN

American reservations against his political past. In September 1942 Grelling and his wife Greta, a so–called "Aryan" who had refused to divorce him, were deported to Auschwitz. They were, in all probability, murdered in the gas chambers at Auschwitz on the day of their arrival.

In January 1941 Grelling wrote from the French camp Gurs to the logician Paul Bernays: "In my wretched situation I try to keep myself up by scientific work. ... Here at the camp I have found two younger friends, one of whom is a very competent mathematician. The other is a philosophically interested author, with whom I discuss both philosophical and mathematical problems." [Peck 1994; 68]

The "author" was the Austrian writer Jean Améry, who in 1971 recollected his meeting with Grelling in Gurs pointedly as follows: "Grelling is very seldom quoted nowadays. Rather than getting ahead professionally, he got into a train to Auschwitz forcefully. Laval had set the course. The logician and mathematician was taught the logic of history, of which he previously didn't want to know anything about." [Am 1971], [Peck 1994; 68]

Grelling in the internment camp Gurs (France)
in the back with beard

The Disappearance of Stochastics from Berlin

In statistics and probability theory important developments took place outside Germany already in the twenties, notably the contributions to probability theory from the Russian and French schools, and the influence on statistics from the British biometrical and the Scandinavian actuarian traditions. **Richard von Mises** was an outstanding and very influential figure on the German scene, though; his theory of probability was intensely and controversially discussed internationally. To be sure, Kolmogorov's measure theoretic approached dominated the field since 1933, but Kolmogorov himself regarded von Mises' intuitive foundation as quite attractive and tried to incorporate it into the theory after the war. The situation was somewhat different in statistics as is illustrated by a remark of H. Hotelling from 1946.

Vassily Hoeffding, a post–war emigrant from Berlin, born 1914, who graduated in statistics from the University of Berlin in 1940, reports about an encounter with Hotelling: "He said he had been impressed by the fact that a Ph.D. in mathematical statistics had come out of Germany." [Hoef 1982; 104]

Among the leading people working in stochastics in Berlin were von Mises, Geiringer, Pollaczek, and Freudenberg who all emigrated. The fate of von Mises and Geiringer is described in detail in Posters 5, 6 and 8.

Felix Pollaczek (1892–1981) was born in Vienna were he was educated as an engineer. He studied mathematics in Berlin, graduating 1922 with a thesis work under Issai Schur (see Poster 11). Work-

ing with the *Reichspost* in Berlin, he started to apply mathematical methods to telephone connections. Dismissed in 1933 he embarked on a complicated Odyssey: first to France, then to Vienna, Brno, the Soviet Union, and eventually, in 1939, back to France. With the help of peasants he managed to survive near Lyon; he became a French citizen after the war. Pollaczek was a mathematician with widespread interests and a thorough training in several fields, notably classical analysis. His most influential contribution is probably his pioneering work in queueing theory, described by Cohen as follows:

"Pollaczek's translation of the many–server queueing model with general service and interarrival distributions is already itself a remarkable achievement for that period. For the resulting system of singular integral equations hardly any results were available in classical analysis at that time; the theory of the Wiener–Hopf integral equation was then still in its early childhood. Here, Pollaczek showed his mastery of classical analysis; the analysis is difficult but has still not been replaced by a simpler and more lucid approach." [Coh 1981; 960]

Karl Freudenberg (1892–1966) graduated in medicine and then took postgraduate studies in mathematics at the University of Berlin. He graduated again under the statistician Ladislaus von Bortkiewicz in 1926. Until 1933 he worked in medical statistics at the *Hygiene-Institut* but in 1938 his *Privatdozentur* was revoked. He emigrated to the Netherlands in 1939 and lived underground during the German occupation. He became the first professor for medical statistics at the Freie Universität Berlin, founded in 1948. [IBD]
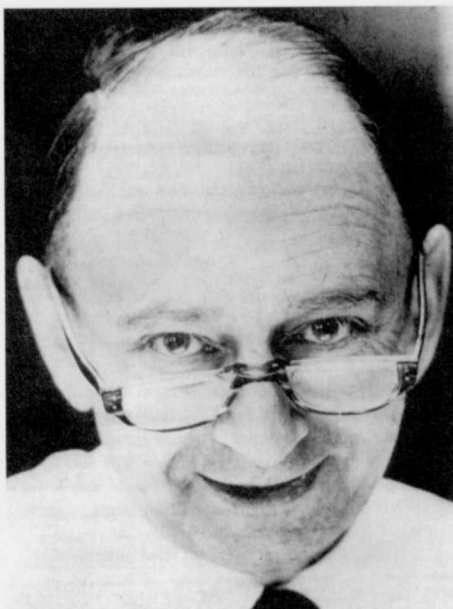
Two other remarkable mathematicians should be mentioned here even though they became active and influential researchers in stochastics only after they had left Berlin, namely Hermann Otto Hirschfeld (who, after emigrating to England, called himself Hartley) and Wolfgang Döblin.

Hermann Otto Hirschfeld (1912–1980) graduated in 1934 under Hammerstein and Schmidt with a thesis work in the calculus of variations. In 1935 he emigrated to England where he earned another Ph.D. in statistics under John Wishart at Cambridge. In 1953 he became the director of the newly founded Institute of Statistics at Texas A.& M. University.

In an obituary (1982) H.A. David remembered: "Hartley was never content to leave his research results in theoretical form. Statistical functions were reduced to tables and inferential methods were accompanied by the computational techniques needed for their implementation. ... His knowledge of both classical and numerical analysis was invaluable." [Dav 1982; 327/28]

Wolfgang Döblin

Wolfgang Döblin (1915–1940) was the son of the famous writer Alfred Döblin who created the most impressive portrait of Berlin during the Weimar Republic in his novel *Berlin Alexanderplatz*, published in 1929. In 1933, the Döblin family emigrated to Paris; they became French citizens soon after. Wolfgang Döblin began his studies of mathematics in Zürich 1933 and continued in Paris 1934–1935. He graduated under Fréchet in 1938 with a thesis of rare impact and originality on Markov chains. Among other things the "coupling technique" invented by Döblin has found renewed interest in the last decades. Döblin joined the French army; in 1940 he committed suicide to prevent becoming a prisoner of the German army. [Cohn 1991]

Hermann Otto Hirschfeld–Hartley

Mathematics of Engineering at the Technische Hochschule

Fuchs, Reissner, Korn, Wagner

The Technische Hochschule Charlottenburg 1937.
At that time, there were no Jewish
mathematicians left at this school.

Richard Fuchs

The theory of aerodynamics and electrical engineering developed significantly in the 20th century, and required considerably more mathematical resources. The use of complex functions in the design of airplane wings, and of the Laplace transform in computing electrical networks are two examples of this development.

Soon after the war the *Siemens–Schuckert Werke* in Berlin founded a research department. The *Deutsche Versuchsanstalt für Luftfahrt DVL* (German Proving Ground for Aviation) in Adlershof [Weis 1985] existed already since 1912. These were but two important enterprises among others in need of mathematically educated engineers in the fields mentioned above. The required academic training was offered at the Technische Hochschule in Berlin–Charlottenburg, but although the importance of these fields rose even more with the Nazis' preparations for war, their pioneers were banned from the Technische Hochschule after 1933.

Richard Fuchs (1873–1945) was the son of Lazarus Fuchs (1833–1902), outstanding analyst and professor at the University of Berlin. His *Aerodynamik*, jointly published with Ludwig Hopf from Aachen in 1922, was the only German text book in the field at that time. Working as a teacher since 1901 at the *Bismarck–Gymnasium* in Berlin–Wilmersdorf, Fuchs earned his *Habilitation* at the Technische Hochschule Charlottenburg in 1906, and became associate professor there in 1922. In 1937, he was dismissed from the Technische Hochschule as "half–Jew", but he was able to join the DVL in Braunschweig later. [NDB], [letter 3]
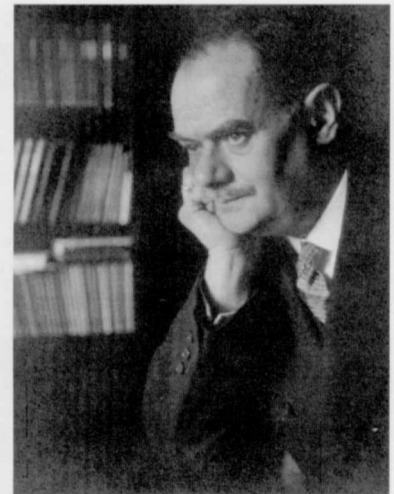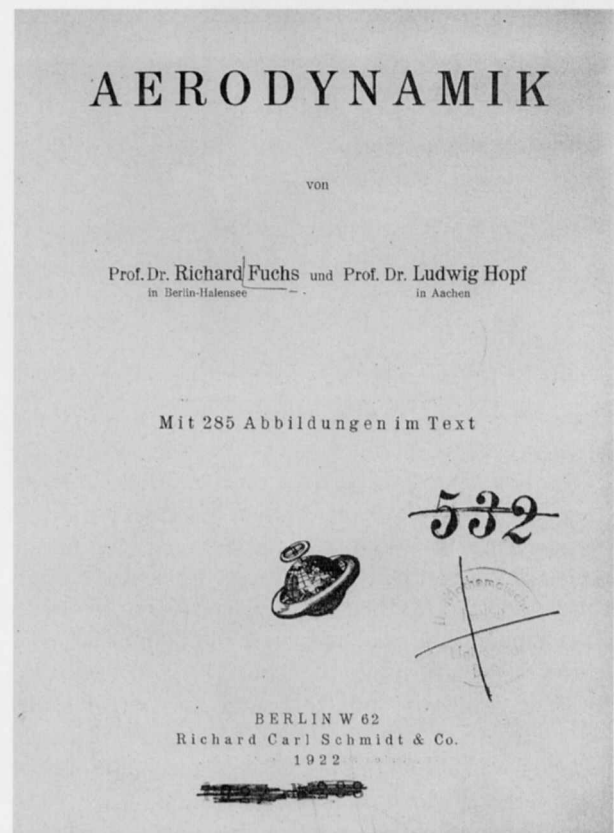
A classic in aerodynamics, written by two mathematicians persecuted during the Nazi period.

One of his students was Axel von Harnack, son of the famous church historian Adolf von Harnack, who also served as President of the *Kaiser–Wilhelm Ge-*

sellschaft in Berlin for many years. In 1964, Axel von Harnack recollected his mathematics lessons at the Bismarck–Gymnasium: "The mathematics professor Dr. Richard Fuchs gave us the feeling of being taught by a true scholar. He also worked part–time as professor at the Technische Hochschule in Charlottenburg and was a highly gifted teacher. His lessons were inspiring and punctuated with good humor which we held in high esteem. He presented the abstract material — based on the abundance of his knowledge — with a lively clarity. He was also in a position to clarify the basics of his subject, as well as those of physics and chemistry, to students who were mathematicall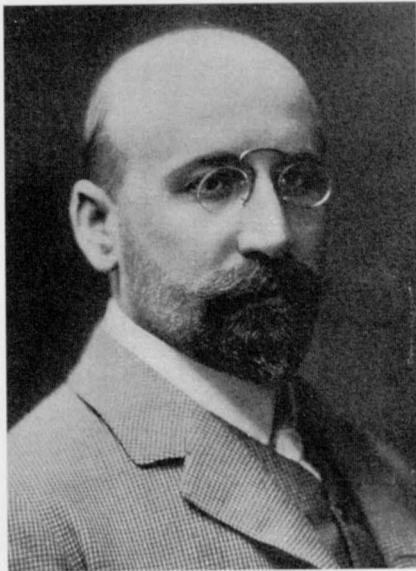y limited. He took us far beyond the level which was achieved at classical grammar schools in those days. We were acquainted with the elements of differential calculus and also taught possible applications" [Har 1964; 470]

Hans Reissner

Hans Reissner (1874–1967) was born in Berlin and became a civil engineer at the Technische Hochschule Berlin–Charlottenburg in 1902. In 1906, he accepted an offer from Aachen as professor of mechanics and successor to Arnold Sommerfeld. At the same time he turned to aviation, especially to propeller analysis. Mathematically, he collaborated with Otto Blumenthal who later on would be murdered by the Nazis (see the list in the Appendix). Around 1910 Reissner designed and constructed a tail first airplane, the so–called *Reissner–Ente* (duck). In 1913 Reissner was appointed professor of mechanics at the Technische Hochschule Charlottenburg. After 1922, he was very active in the newly founded *Gesellschaft für Angewandte Mathematik und Mechanik* (GAMM) and became its vice–president. He lost his position in 1936 and left for the United States in 1938, where he held positions in Chicago and Brooklyn.

Reissner's son, Eric Reissner (1913–1996), emigrated

to the US already in 1936 and became an applied mathematician in his own right. In an obituary, written in 1977, he remarked the following about the delayed emigration of his father: "It is likely that if H.R. had been ten or fifteen years younger it would have been easier for him to decide what to do under the new circumstances. As it was, he stayed in his post until 1936 and then, in 1938, at the age of sixty–four, he came to the United States. ... To those who had known him earlier a change would be apparent, a change from a positive and optimistic outlook to one of caution and some pessimism." [Rei 1977; 104]
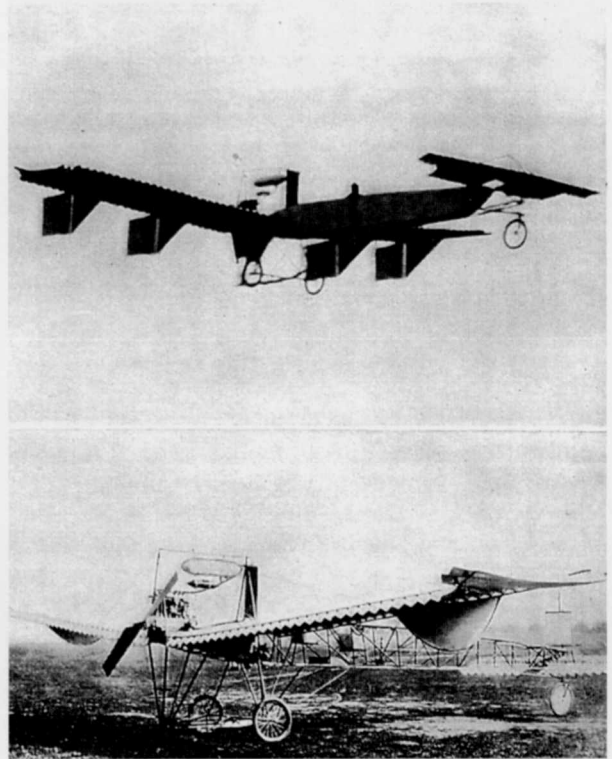
The Reissner–Ente

Even more famous than H. Reissner (for his "Ente") was the applied mathematician and physicist **Arthur Korn (1870–1945)**. At the beginning of the century he developed a phototelegraphy system which was used e.g. by the police for crime prevention.

Korn took his *Habilitation* in physics at the Ludwig–Maximilians Universität in München in 1895. He saw himself in the tradition of the great French mathematician and physicist Henri Poincaré, and in this spirit he wrote an influential *Lehrbuch der Potentialtheorie* (Berlin 1900). In 1907, Korn wanted to obtain a professorship for applied mathematics in München, and got into in a severe conflict with Conrad Röntgen [Lit 1993]. In 1914, he accepted an honorary professorship at the Technische Hochschule in Berlin–Charlottenburg. He was "sent on leave" in 1933, and dismissed in 1935. Only after considerable efforts he did arrive in the United States in 1939,

where he died a few years later. His invention was honoured in a historical report on facsimile communication in 1971: "Korn's principal contribution was the introduction of photoelectric scanning. ... In 1902 Korn publicly demonstrated the first practical photoelectric fax system for the transmission and reproduction of photographs. Five years later he established a commercial picture transmission system that was at first confined to Germany, but which, by 1910, linked Berlin with London and Paris." [Cost 1971; 3]

Karl Willy Wagner

Karl Willy Wagner (1883–1953) was director of the *Telegrafentechnisches Reichsamt* (technical office of telegraphy) for many years and founded the magazine *Elektrische Nachrichtentechnik* in 1924. In 1930, a professorship for the theory of vibration was established for him at the Technische Hochschule Berlin–Charlottenburg, but he had to give it up in 1936, because he had employed Jewish and foreign scientists at his institute [Rür 1979 I; 28]. Wagner thereafter accomplished the mathematical foundations of Heaviside's operator calculus in his most important work *Operatorenrechnung und Laplacesche Transformation nebst Anwendungen in Physik und Technik* (1940). This was closer to the needs of the electrical engineers than the well–known treatise by Gustav Doetsch (1937). In 1943, after many years of forced retirement, Wagner was appointed as consultant in the research group of the *Oberkommando der Marine* (Supreme Command of the Navy). [Weih 1983; 189/90]

Wissenschaftliche Veröffentlichungen des Kriminalistischen Laboratoriums der Polizeidirektion Wien
Wissenschaftl. Vorstand: Dozent **Dr. Siegfried Türkel**

Die Bildtelegraphie im Dienste der Polizei

VORTRAG
gehalten auf dem zweiten internationalen Polizeikongreß zu Berlin im September 1926 (in erweiterter Form)

von

PROFESSOR Dr. ARTUR KORN

GRAZ 1927

Verlag von Ulr. Mosers Buchhandlung (J. Meyerhoff)

Phototelegraphy as a Police Tool
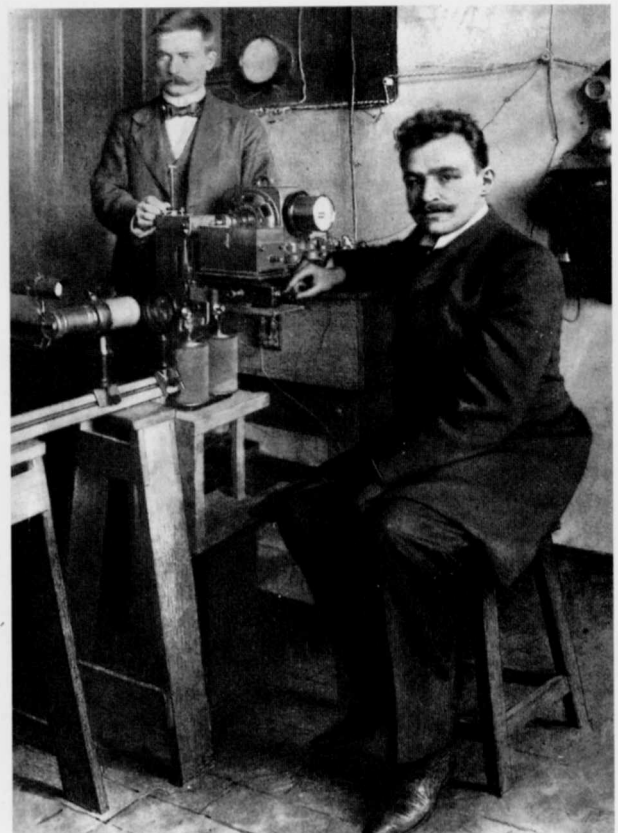
Arthur Korn with his telegraph

School Teachers of Mathematics

Lilly Görke, Leopold Löwenheim, and others

With a multitude of schools representing the traditional *Gymnasium* and other flourishing secondary schools, Berlin offered professional opportunities also to mathematicians who did not want to pursue an academic career. Quite a few of those who became high school teachers (Alfred Barneck, Richard Fuchs, Ernst Jacobsthal, Walther Jacobsthal) taught also at a university, usually the Technische Hochschule (see Posters 9 and 17). Some became influential in educational politics, such as Felix W. Behrend, the father and teacher of Felix A. Behrend (see Poster 24). Other mathematics teachers continued to do research, but did not work at a university, like the logicians Kurt Grelling (see Poster 15) and Leopold Löwenheim. The chances of emigration for mathematics teachers not recognized through research results were distinctly worse than for renowned scientists; in their case the international community of mathematicians could be of little help. Most of the expelled teachers were Jewish, but there was at least one case of politically motivated persecution: The differential geometer **Eduard Rembs** lost his position at a *Gymnasium* in 1937 as a consequence of a denunciation (see Poster 20).

The fates of Eduard Rembs and the "half–Jew" Lilly Görke who both obtained positions at universities in Berlin after 1945 could be documented rather completely. We are also well informed about the lives of Leopold Löwenheim and **Käte Sperling**, in the latter case maybe only because her husband Werner Fenchel was a well–known mathematician (see Posters 11 and 21). But what exactly happened to **Walther Jacobsthal (1876–?)**, a mathematics teacher, university lecturer and astronomer on his way to emigration? In America he called himself "Bruns" — possibly after a Leipzig astronomy professor [Dre 1942; 423]. Under which circumstances did **Arthur Cohn (1894–1940)** succeed in getting to Palestine, where in 1940 he reportedly lost his life in a boat accident near Haifa? [letter 4] Cohn graduated in 1921 with Schur submitting the thesis *Über die Anzahl der Wurzeln einer algebraischen Gleichung in einem Kreis*. Later he became teacher at a *Gymnasium*, too (see also Poster 11).

What happened to the Jewish mathematics teachers, who couldn't emigrate? Many may have shared the fate of **Margarete Kahn (1880–1942)*** who was murdered by the Nazis. [Tob 1997; 50] Further names of Berlin mathematics teachers with uncertain

fates can be found in [Toe 1991], (see also the section "Lost Tracks" below). In the article by Pinl and Furtmüller we find the following statements about **Alfred Barneck (1885–1964)**, who was a teacher and an (unpaid) university lecturer for descriptive geometry at the Technische Hochschule: "His Jewish ancestry must have been remote, for after having been suspended from both his academic and secondary school posts in April 1933 under the 'Aryan Clause', he was reinstated at the Realgymnasium, but retired eventually on racial grounds in December 1944. This happened under clause 72 of the Civil Service Act of 1937, which applied to anyone who had erroneously but in good faith declared that he and his spouse were of 'German or kindred blood'." [Pi/Fu 1973; 155]

Two teachers shall be mentioned here as representatives of their persecuted colleagues, since their lives could be relatively well documented.

Lilly Görke

Lilly Görke (1904–1992) studied mathematics at the University of Berlin. She graduated in 1931, under her maiden–name of Buchhorn, with the rather philosophically orientated topic *Evidenz und Axiome im Aufbau von Sigwarts Logik*. In 1933 she was banned from the university. When she applied for a school teacher's position after her year of probation she was rejected because of the relationship of her mother to the Jewish family Cassirer. Görke fought her way through the Hitler era, working first as a private tutor and later in a pharmacy. From 1946, she worked, mainly in mathematical didactics, as a *Dozentin* at the University of Berlin, which was later called *Humboldt–Universität*. [Pie 1992]

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* **Page 39:** About Margarete Kahn

Stiftung"Neue Synagoge Berlin - Centrum Judaicum"

בית הכנסת החדש ברלין - צנטרום יודאיקום

Frau
Dr. Renate Tobies
Erwin-Schrödinger-Straße

67663 Kaiserslautern

Berlin, 07.01.1997

Sehr geehrte Frau Dr. Tobies,

auf Ihre Anfrage vom 08.11.1996 konnten wir folgende Angaben ermitteln.
Frau Dr. Margarete Kahn wurde am 27.08.1880 in Eschwege (Hessen-Nassau) geboren und lebte
zuerst in Berlin-Wilmersdorf, Motzstr. 75 und zur Zeit der Volkszählung 1939 in Berlin-Wilmers-
dorf, Rudolstädter Str. 127. Von Beruf war sie Studienrätin und mußte später als Fabrikarbeiterin
bei der Firma „Nordland Schneeketten" Zwangsarbeit leisten. Frau Dr. Kahn wurde am
28.03.1942 mit dem 11. Transport nach Trawniki deportiert und gilt als dort „verschollen".

Zu Frau Klara Löbenstein konnten wir in unseren Unterlagen leider keine Angaben ermitteln.
Vielleicht können Ihnen die Kollegen im Landesarchiv Berlin, Kalckreuthstr. 1-2, 10777 Berlin da
weiterhelfen.

Mit freundlichen Grüßen

Sabine Hank
(Archivarin)

Leopold Löwenheim

Leopold Löwenheim (1878–1957) became famous for his important theorem on the position of countable models in the foundations of mathematics which was published in the article *Über Möglichkeiten im Relativkalkül* (Mathematische Annalen 1915). In 1933 he was compelled to retire as a teacher because he was regarded as "25% non–Aryan", i.e. someone who had one grandparent of Jewish religion. Löwenheim continued to work in the field of mathematical logic and published, in 1940, in the *Journal of Symbolic Logic*. A desaster happened to him on August 23, 1943, when his scientific manuscripts perished in the first major air–raid on Berlin. Between 1946 and 1949 Löwenheim again worked as a teacher at a *Gymnasium*. [Thie 1975]

The Gesellschaft für Empirische Philosophie

The Association for Empirical Philosophy

The *Gesellschaft für empirische Philosophie* (Association for Empirical Philosophy) was founded in Berlin in 1927. [Hoff 1993] Its *spiritus rector* was the school teacher and positivistic philosopher **Joseph Petzoldt (1862–1929)**, a follower of Ernst Mach. In 1929, the group was renamed *Gesellschaft für wissenschaftliche Philosophie* (Association for Scientific Philosophy) following a suggestion of David Hilbert.

The new name partly reflects the somewhat stricter neo–Kantian orientation of the group in Berlin in comparison with the *Wiener Kreis des logischen Empirismus* (Vienna Circle of Logical Empiricism). The intellectual leaders of the group were the philosophers **Walter Dubislav (1895–1937)** and **Hans Reichenbach (1891–1953)**, both of them working very close to mathematics.
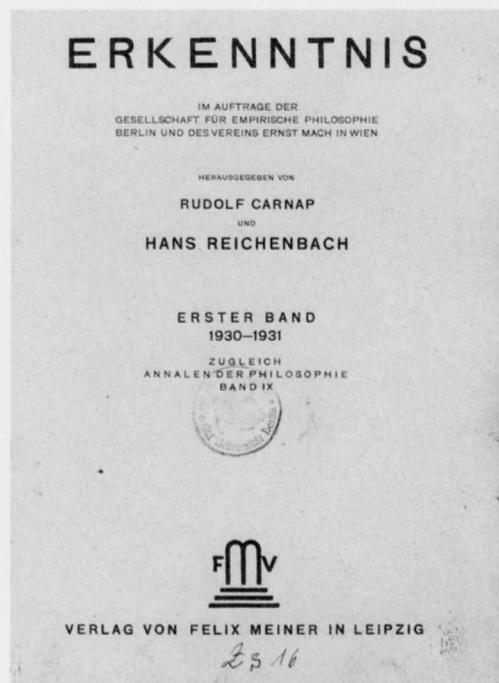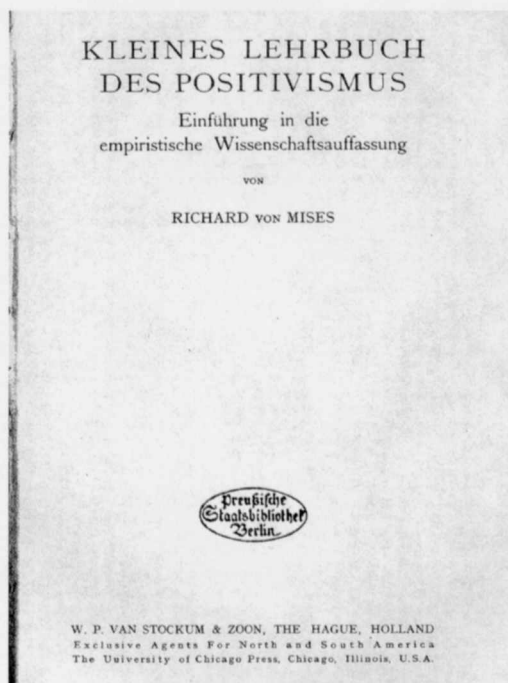
PROFESSOR CARL G. HEMPEL

Carl G. Hempel, philosopher of science, died on November 9 aged 92. He was born on January 8, 1905.

CARL G. HEMPEL was the last survivor of the Vienna circle of logical positivists. They and the logical empiricists had significant philosophical differences, but the two groups were in close communication. Both emphasised the scientific approach to philosophy, in contrast to the speculative and mystical approaches that dominated much of Western philosophy in the late 19th and early 20th centuries. Their work relied heavily on the logical systems expounded by Whitehead and Russell in *Principia Mathematica*.

Most of Hempel's work deals with problems that lie at the foundations of the sciences, physical, biological and social. His most significant work deals with the nature of scientific explanation, on which he was probably the pre-eminent 20th-century authority. A paper he wrote with Philip Oppenheim, *Studies in the Logic of Explanation* (1948), has been characterised as the fountainhead from which virtually all work on this topic in the second half of the century has flowed.

His magnum opus on this subject is the principal piece in his *Aspects of Scientific Explanation and Other Essays in the Philosophy of Science* (1965). The other essays in that book break new ground in topics such as scientific confirmation, the nature of scientific theorising and the meanings of concepts in science. Like all of his writings they ally exceptional clarity and philosophical profundity. *Aspects* is widely used as an introduction to the philosophy of science for advanced philosophy students; his 1966 book *Philosophy of Natural Science* is a highly successful introduction at a more elementary level.

Another important work was his 1952 monograph *Fundamentals of Concept Formation in Empirical Science*, which was published in the *International Encyclopaedia of Unified Science*. This compendium of 19 monographs by scientifically minded philosophers and philosophically in-

clined scientists aimed to incorporate the main results of logical positivism and logical empiricism, along with those of closely related schools such as American pragmatism.

Carl Gustav Hempel, informally known as Peter, was born in Oranienburg, Germany, and studied mathematics, physics and philosophy at Göttingen, Heidelberg,

Vienna and Berlin. His training in maths and science was rare for philosophers at the time. It signalled his lifelong commitment to the precise methods of these disciplines. In 1934 he received his doctorate in Berlin for work on probability under Hans Reichenbach, the founder of the school of scientific philosophy known as logical positivism.

Although not Jewish, Hempel so abhorred the anti-Semitism of Hitler's regime that he moved to Belgium in 1935, and then to the US in 1938. He held a research post at Chicago University, and then taught at the City College of New York, Queens College and Yale before serving as Stuart Professor of Philosophy at Princeton, 1955-72. In retirement he took a chair at Pittsburgh, teaching and researching until 1985.

The holder of Fulbright and Guggenheim fellowships, he was also a fellow at the Center for Advanced Study in the Behavioural Sciences at Stanford. He was a fellow of the American Academy of Arts and Sciences and of the American Philosophical Society, and a corresponding member of the British Academy.

Hempel's first wife died in 1944. He is survived by his second wife, Diane Perlow, and by a son and daughter.

Walter Dubislav   Hans Reichenbach

Walter Dubislav worked at the Technische Hochschule and Hans Reichenbach worked at the University, however not as full professors. Reichenbach published in *Mathematische Zeitschrift* about axiomatics of probability theory; Dubislav wrote a book about *Definitionslehre*, which was already in its third edition in 1931.

The Association edited the periodical *Erkenntnis*, starting in 1930, and conducted well–visited seminars. Regular participants included psychologists (Kurt Lewin, Wolfgang Köhler), the physician Friedrich Kraus, the brain researcher Oskar Vogt, other mathematically–oriented scientists like the doctoral students Olaf Helmer–Hirschberg and Carl Gustav Hempel, and, of course, mathematicians such as Kurt Grelling and Leopold Löwenheim.

Emanuel Lasker (see Poster 24), John von Neumann (see Poster 10), and Richard von Mises (see Poster 5) participated occasionally. Richard von Mises was seriously interested in philosophy. He kept in contact with the Vienna Circle by means of his frequent visits to his Austrian home country and, after his emigration, wrote an important book about positivism (1939). The aim of the Berlin Association, like that of the Vienna Circle was the philosophical founding of a modern view of life
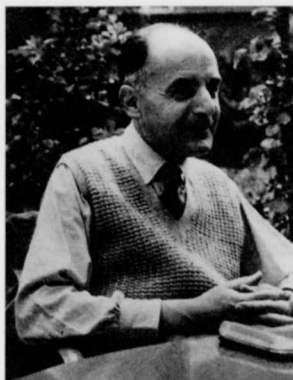
Kurt Grelling   Olaf Helmer–Hirschberg

Carl Gustav Hempel (Obituary from The Times, Dec 9, 1997)

taking into consideration revolutionary scientific discoveries of the early 20th century (general relativity, quantum mechanics, Gestaltpsychologie).

The Berlin group was not immediately banned in 1933. There were certain political attacks, but the meetings continued, especially on the initiative of Grelling. However, the political atmosphere which soon drove even "Aryan" scientists, such as Hempel and Dubislav, to leave the country, brought an end to the existence of the Association in Berlin. After emigration Hans Reichenbach and his student Carl Gustav Hempel (1905–1997) contributed decisively to the rise of the analytic scientific philosophy in the United States; Olaf Helmer–Hirschberg (born 1910) also made an impressive career as a futurologist there.

A letter of Hans Reichenbach to the philosopher Ernst von Aster in Gießen, from the summer of 1935, sheds light on the scale of the (earlier) activities of the Association: "I must say that I am very sorry that you almost always only write about the Vienna Circle. ... Our Association for Scientific Philosophy united a group of 100 to 300 people every two to three weeks at lectures and discussions ... and last but not least, the (periodical) *Erkenntnis*, indeed the most important link in our organizational work, was founded in Berlin. The group in Berlin has only been driven apart by the Hitler government, but it still continues to live on as a virtual unit; and just now where our work has been so badly affected by

the political development, it means a lot to me that this work should be mentioned at least in the history of our movement." [Hoff 1993; 386]

In 1937 the meetings of the Association still went on as we learn from a letter by the already emigrated Hempel, written after a visit to Berlin: "We met Dr. Grelling several times. He is now trying to build kind of a centre of logic in Berlin; he has two seminars and one colloquium. Löwenheim, the father of the Skolem–Löwenheim paradoxies, whom Grelling quasi 're–discovered' in Lichterfelde, also attends the colloquium. Löwenheim was highly amazed to hear from Grelling that in the meantime he and his work had become quite renowned. Löwenheim indeed still works in the field of logic, but hardly follows the literature." [Peck 1994; 63]

The physicist and philosopher Philipp Frank recalls the philosophical efforts of Richard von Mises in his obituary of 1954: "In *Positivism, a Study in Human Understanding* v. Mises gave us a summary of his views on many topics in science and life. In this book the word 'positivism' is not meant to designate a sectarian doctrine of some philosophical school; v. Mises used it, rather, to characterize a way of presenting his views that takes its cue from the methods of science ... v. Mises did not fail to emphasize that the role played by human imagination is not less important in the invention of scientific theories than it is in the works of art and in religion." [Fra 1954; 824]

Repression Against Non–Jewish Mathematicians

Josef Naas, Helmut Grunsky, and others
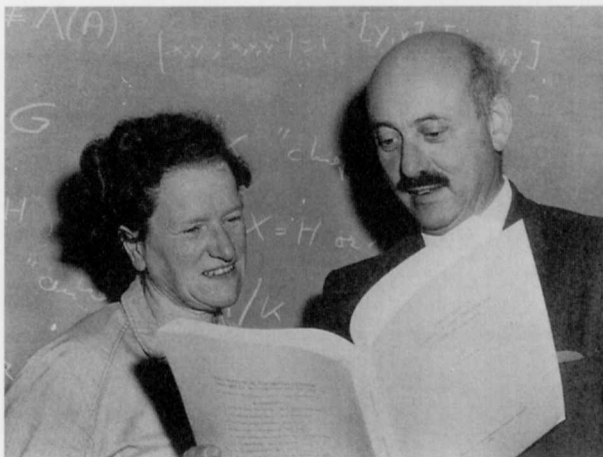
Hanna and Bernhard Neumann

About 90% of the mathematicians forced to emigrate by the Hitler regime were "non–Aryan". But there was also an emigration of non–Jewish mathematicians. In Berlin this applied to **Hanna von Caemmerer (1914–1971)** and **Carl Gustav Hempel**. Von Caemmerer, one of Issai Schur's students, emigrated out of loyalty to her Jewish companion and later husband, Bernhard Neumann (see Poster 11). After her death a mathematician closely connected to her (presumably B.H. Neumann) wrote about her reason for emigration: "When she was (rightly) suspected of being friendly to Jews, one of her professors at the University of Berlin made it impossible for her to continue there." [microfilm; roll 47]. By contrast, Hempel apparently didn't see any chances for his approach of a mathematically supported an-

alytical scientific theory (see Poster 19) under the political conditions of the Nazi regime.

The non–Jewish mathematicians who remained in Germany had conflicts with the regime on various levels.

Josef Naas (left)

There was the conscious political opposition from the differential geometer **Josef Naas (1906–1993)**, who was closely associated to communism, and, because of this, eventually was forced into a concentration camp. Naas was at the *Deutsche Versuchsanstalt für Luftfahrt* (German Proving Ground for Aviation) in Adlershof in the thirties and at times active at the *Reichsluftfahrtministerium* (Aviation Ministry). At the beginning of 1942, because of sabotage, he was taken to the KZ Mauthausen as a political prisoner. After the war Naas worked in a high office at the Academy in East Berlin and published, together with H.L. Schmid, the *Mathematisches Wörterbuch.* [Gä 1993]

There was the delaying and courageous resistance by **Helmut Grunsky (1904–1986)**, the editor of the *Jahrbuch über die Fortschritte der Mathematik,* against the pressure to dismiss his Jewish collaborators. Grunsky was Bieberbach's doctoral student (1932) but got into a conflict with him about the question of employment of "non–Aryan" referees at the *Jahrbuch* in the middle of the 1930's.

Grunsky was an acknowledged researcher in the theory of analytic functions but, eventually, he was replaced as editor by the party–liner Harald Geppert. His *Dozentur* at the University of Berlin was prevented. After the war Grunsky held positions as visiting professor in the United States before he could gain a foothold in the German university system he

became a professor at Mainz in 1951 and later at Würzburg. [Sie 1993a]

Helmut Grunsky

Eduard Rembs

The differential geometer and secondary school teacher **Eduard Rembs (1890–1964)** submitted a thesis for his *Habilitation,* and thereby initiated the following denunciation by Ludwig Bieberbach, in a letter of February 1936 to the ministry:

"Dr. Eduard Rembs submitted a notification of Habilitation in the subject of mathematics to my faculty. He ... stated on the questionnaire given to him that he was a member of the Social Democratic Party from 1919 until the beginning of 1933, he was also a member of the Association of Social Democratic Teachers from about 1926 until the beginning of 1933, and also a member of the *Deutschen Friedensgesellschaft* (German Peace Association) for about a year (1930?), and after that he was a member of the

Page 44: A letter from L. Bieberbach to H. Grunsky, 1938. " ... Above all, may you finally dismiss the Jews from your staff in the New Year. There are far too many for me to see an absolute necessity for this. ... I emphasize once again that your staff of referees must be in accordance with the regulations which have been obligatory to all Germans since January 30, 1933. ... You see how your conduct harms the good reputation of the Academy". (This document shows that Jewish referees were still employed at that time.)

Prof.Dr. BIEBERBACH.   Bln.-Dahlem, den 11.Januar 1938.
                                        Gelfertstr.16.

Herrn
    Dr. H. G r u n s k y ,
        Charlottenburg,
          Kaiser Friedrich Str.59.

                    Sehr geehrter Herr Doktor!
                    Besten Dank für Ihre Neujahrswünsche, die ich für
        Sie und Ihre Frau erwidere. Möchte es Ihnen im neuen Jahr
        vor allem nun endlich beschieden sein, die Juden aus
        Ihrem Mitarbeiterstab loszuwerden. Die Durchsicht der
        bisher erschienenen Hefte des Jahrgangs 1936 - vor Heften
        früherer Jahrgänge will ich im Augenblick nicht reden -
        zeigt eine grosse Zahl an Juden vergebener Referate. Es
        sind zu viele, alsdass ich eine zwingende Notwendigkeit
        einsehen könnte. Eine nur bei dem betreffenden Juden vor-
        handene Sachkenntnis kann ich auch nicht anerkennen. In
        den meisten Fällen würde z.B. ich selber ohne weiteres in
        der Lage gewesen sein, das Referat zu schreiben. Soweit
        ich gefunden habe, sind es die folgenden Juden, mit denen
        Sie Beziehungen unterhalten: Rogosinski, E.Rothe, Berwald,
        Freudenthal, Mahler, Rosenthal, Behrend. Von den jüdisch
        versippten will ich im Augenblick nicht reden, wiewohl
        auch deren Entfernung notwendig ist. Ebenso werden Sie
        sich von den wegen § 175 verurteilten Referenten trennen
        müssen.
                    Ich betone erneut, dass Sie Ihren Referentenstab
        nach den Richtlinien zusammensetzen müssen, die seit dem
        30. Januar 1933 für jeden Deutschen verbindlich sind. Sie
        laufen jedenfalls Gefahr, dass Ihr Handeln als mangelnder
        politischer Instinkt ausgelegt werde. Was soll ich im
        Falle eines kürzlich von auswärts an mich herangetretenen
        Angriffes auf die Akademie sagen, der man es zum Vorwurf
        macht, dass sie (die Akademie) noch immer beim
        Jahrbuch jüdische Referenten beschäftige? Ich kann
        doch darauf nur sagen, dass ich mir seit Jahr und
        Tag alle Mühe gebe, zu erreichen, dass Sie die Juden
        abbauen, dass aber mein Bemühen noch immer keinen
        vollen Erfolg hatte, weil Sie immer wieder Gründchen
        finden, einen oder den anderen Juden heranzuziehen.
        Sie sehen, wie Sie durch Ihr Verhalten das wohlver-
        standene Ansehen der Akademie schädigen.

                        Heil Hitler!
                        Bieberbach

Deutscher Friedensbund (German Peace Union) until the beginning of 1933. In his curriculum vitae he stated that he is still *Studienrat* at the Kantgymnasium in Spandau. This seems very conspicuous to me in view of his aforementioned political past. I request you to check how it can be that Dr. Rembs is still in office as *Studienrat*." [Bieberbach Papers]

It is almost superfluous to mention that not only Rembs' *Habilitation* was not successful but that he was even dismissed from the school system. In 1953, when Bieberbach was admitted as member of the *Berliner Mathematische Gesellschaft*, Rembs left that organization in protest and anger. [Kno 1998]

Helmut Wielandt

Even more frequent, however, was a discrimination against mathematicians simply for the reason that they didn't offer their services to the regime. This applied, for instance, to Helmut Wielandt, a student of Schur, and the topologist **Erika Pannwitz (1904–1969)**, who in spite of excellent graduations only found rather unattractive positions at the *Jahrbuch über die Fortschritte der Mathematik* edited by Grunsky. Pannwitz was additionally impeded in her career by the discrimination against working women during the Nazi era [Sie 1993a].

Helmut Wielandt (born in 1910), today renowned for his deep and beautiful work on finite groups, in particular in permutation groups, eventually did become *Privatdozent* at Tübingen in 1939, after he (like Grunsky) had joined the Nazi Party NSDAP. In 1946 Wielandt described the considerations leading to this step in his curriculum vitae:

"Although in the opinion of my teachers Issai Schur and Erhard Schmidt all prerequisites were essentially fulfilled for entry into the university career I had strived for, I was repeatedly ignored when assistant positions became vacant in Berlin over the next years. I refrained from any political activity and continued my unbiased communication with fellow Jewish stu-

dents and my teacher Schur. ... After three years I was faced with the alternative of either leaving the field to scientific inferiors, and foregoing my university teaching career for an unforeseeable period, or yielding to the prevailing interpretation of the Civil Service Law in Berlin, which required membership of NSDAP and SA from all the junior candidates. In 1937 I declared my entry". [letter 5]

Hans Rohrbach

Even the relatively early NSDAP members such as **Hans Rohrbach (1903–1993)** got into problems if they didn't observe the taboos of the regime exactly. Rohrbach showed loyalty with his teacher, Issai Schur, and especially with his dismissed friend, Alfred Brauer. Because of this, Bieberbach sent him off to Göttingen in 1936, and wrote to the Rektor of Göttingen University: "By change of location I hope to attain that Mr. Rohrbach gets away, to some extent, from his long standing friendship to a Jewish front–liner [i.e. in World War I]. In general one can certainly not say that Mr Rohrbach has sympathies for Judaism. ... He is hardly the man who would be capable of setting a national socialistic tone at the Institute in Göttingen, if such doesn't prevail there already." [Sie 1989; 58]

The Rescue Squad Abroad

Bohr, Courant, Duggan, Hardy, Veblen, Noether, Weyl, and others

Most visible in their efforts to help expelled German and other European mathematicians were Harald Bohr (Denmark), Godfrey Harold Hardy (England), Oswald Veblen (U.S.), and Richard Courant and Hermann Weyl — the German emigrants from Göttingen. These five men had already collaborated before 1933, notably in the distribution of international fellowships for young mathematicians offered by the Rockefeller Foundation. Much of their work in the U.S. after 1933 was coordinated by Stephen Duggan and the *Emergency Committee in Aid of Displaced German* (later: *Foreign*) *Scholars* (EC) in New York City; the EC was also partly supported by Rockefeller. In addition, Emmy Noether and Hermann Weyl founded a *German Mathematicians' Relief Fund* in 1934, which sought donations between one and three percents of salaries from German scholars who had already obtained a university position in the U.S. These efforts were supported by other mathematicians such as Roland Richardson (Secretary of the American Mathematical Society), and by the astronomer Harlow Shapley (Harvard). There was severe academic unemployment in the U.S. around 1933 which made it even more difficult to find jobs for foreigners. [Rid 1984]

Richard Courant

Richard Courant (1888–1972) was an influential analyst with a distinctive sense for interesting applications. He played an important role in the flourishing institute of mathematics in Göttingen before1933. After being expelled, he established a centre at New York University with a strong orientation towards applications which was subsequently named after him. There he created work possibilities for numerous emigrants. He also helped with the placement of mathematicians from Berlin in positions in the United States, as in the case of Hilda Geiringer. [Reid 1976]

Harald Bohr

Harald Bohr (1887–1951), brother of the physicist Niels Bohr, was one of the founders of the theory of almost periodic functions. He himself had to flee to Sweden after the Nazi occupation of Denmark because of his partly Jewish ancestry. Käte Sperling–Fenchel (see Poster 11) worked as a private secretary to Harald Bohr for several years after her emigration from Berlin. [Jes 1993]

Page 47: Weyl circular

Stephen Duggan

Stephen Duggan (1870–1950) was a liberal political scientist. In 1919, he had founded the Institute of International Education in New York City in connection with the Carnegie Endowment for Peace. After 1933, his Emergency Committee organized temporary appointments for over 300 scholars, among them at least two mathematicians from Berlin, Alfred Brauer and Hilda Geiringer. [Dug 1943], [Dug/Dru 1948] Allegedly, he committed suicide since his connections with foreigners placed him under suspicion during the McCarthy era. [Lew 1985; 190].

GERMAN MATHEMATICIANS RELIEF FUND
Institute for Advanced Study
Princeton, N. J.
May 18, 1940

Dear Colleagues:

$300 went to Dr. Edward Helly as proposed in my circular of December 11, 1939. In the meantime Dr. Helly has found a (meagerly paid) position in the College of Paterson. When in the same letter I moved $100 for Dr. Peter Scherk I did not know that he had obtained a tutoring position at Taft School in Connecticut, effective from September 1, 1939; my proposal met with objections on this ground, and I therefore turned over only the $15 earmarked for him.

200 Swiss francs were paid to Dr. Paul Bernays, Zürich; the contribution was earmarked for him.
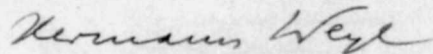
Our balance at present amounts to $285.09. Since Dr. Scherk lost his job in February on account of illness, and is now in miserable circumstances, I propose to pay him $135, which would bring the total amount given to him by our fund up to $300.

Moreover I move to give $135 to the young mathematician, Gottfried Noether. Supported by the Quakers he has this year done very well at Ohio State University; for next year he has a scholarship in the Graduate School of the University of Illinois carrying $300. While Emmy Noether was alive she contributed to our fund far more generously than anybody else; I feel we owe it to her to support the son of her beloved brother Fritz with a fraction of what she gave to us.

If no objection to these proposals is raised during the next ten days, I shall assume your consent.

Hermann Noether, Fritz's other son, will probably again receive a refugee scholarship at Harvard for next year. I am informed that Schwerdtfeger lost his job in Australia after the outbreak of the war. A. Rosenthal recently arrived in this country and now holds a research fellowship at the University of Michigan effective for one year from the date of his arrival.

Sincerely yours,

Hermann Weyl

Hermann Weyl

Godfrey H. Hardy

Godfrey Harold Hardy (1877–1947), outstanding both in number theory and analysis, was generally recognized as one of the leading English mathematicians of his time. He strongly opposed the boycott against German science after the First World War. Under Hardy's influence, Cambridge became a home for eighteen expelled mathematicians from the continent, among them Richard Rado, Bernhard Neumann, and Kurt Hirsch from Berlin.

Emmy Noether

Emmy Noether (1882–1935) pioneered abstract structural thinking in algebra and was the driving force of the famous Göttingen algebraic school. After her emigration to the U.S. in 1934, she and Hermann Weyl founded the *German Mathematicians' Relief Fund*. She was one of its most generous contributors until her untimely death. [Sri/Sa 1983]

Oswald Veblen

Oswald Veblen (1880–1960) led the Princeton School of algebraic topology together with Solomon Lefschetz and James Alexander. For almost a decade his *Analysis Situs* of 1922 was the only systematic treatment in bookform of the pioneering ideas of Henri Poincaré. His papers in the Library of Congress (Washington) clearly demonstrate his unselfish work for dozens of European immigrants. [Dur 1988/89, vol. I; 118-129]

Hermann Weyl

Hermann Weyl (1885–1955) was one of the most influential mathematicians of this century; he made fundamental contributions to almost every area of modern mathematics. Weyl was himself an emigrant to the U.S. from Göttingen because of the Jewish ancestry of his wife. His wide-ranging activities in all areas of cultural life also comprised the management of the *German Mathematicians' Relief Fund* for more than ten years.

Emigration

People striving for emigration, in front of a travel agency, 1939

44 of the 53 Berlin mathematicians who were "persecuted and expelled" emigrated, which is to say more than 80% of them. Of the 53 merely six were not "racially" persecuted; of the 44 emigrants only three. Three of the Berlin mathematicians who were persecuted as Jews were murdered by the Nazis (Grelling, Kahn, Remak), after two of them had tried in vain to emigrate.

There were lots of bureaucratic barriers to emigration, both in Germany and in the host countries. Mathematicians without German citizenship such as Michael Golomb (who had a Polish passport) faced additional problems.

Twenty-one of the mathematicians who emigrated reached the United States already before 1945. Great Britain became the final destination before 1945 of seven mathematicians who were expelled; it temporarily admitted a further three. Only two mathematicians who emigrated from Berlin survived in a country on the European continent: Felix Pollaczek was hidden in 1943 by a French farmer near Lyon and Karl Freudenberg survived in the Netherlands in the underground movement.

The predominant emigration to the United States can be explained by the development of war throughout Europe and the relatively favourable terms of admission there. Of course, the emigrants to the United States, too, had to overcome bureaucratic hindrances, strong competition in the American job market, and, to some extent, anti–Semitism. However, a rule in the American immigration act of 1924 allowed entry beyond the stipulated immigration quota for university professors who had still been active within the last two years before their emigration. Some younger mathematicians (W. Le-

dermann, E. Reissner) had the chance to emigrate with a student visa, and in some cases even when they had already completed their dissertation in Germany (Reissner). Some emigrants (Hirschfeld–Hartley, Hirsch, Neumann, Rado) graduated again abroad in order to adjust themselves better to the new environment.

To illustrate the difficulties of immigrants in the USA and their problems in the countries which only temporarily admitted them, we give three quotations by expelled Berlin mathematicians.

The former Berlin topologist Heinz Hopf wrote in 1938 to Richard Brauer about his brother **Alfred Brauer** (see Poster 11), who after his dismissal in 1935 was still in Berlin and hoped for a chance to emigrate: "The US Consulate in Berlin declared that he could not receive the so–called 'professor visa' (with which one can immediately enter the US) and that according to law it was only for people who were in an academic position during the last two years and that he hadn't been in such a position!! He had to register as an immigrant and wait a few years".

Michael Golomb (born 1909) was a student of Adolf Hammerstein and got his doctorate from the University of Berlin in 1933. The picture was taken in 1938 in Zagreb (Yugoslavia), his first place of refuge. In 1939 he emigrated to the United States and turned to applied mathematics. He was one of the first to apply normed spaces in numerical analysis.

Eric Reissner (see Poster 17) described in 1994 the circumstances of his emigration: "My existence in America started with a one–year student visa, after

I. Schur (a friend of my father) sent a letter to Eberhard Hopf which led to an invitation from M.I.T.'s Department of Mathematics and a scholarship there. After some months I was promised an assistant position (1937–39) and this enabled me to get an immigration visa (in Niagara Falls)." [letter 6]

The philosopher and probabilist **Hans Reichenbach** (see Poster 19) had trouble overcoming the cultural shock of emigrating to Turkey. In 1936 he wrote from Istanbul the following letter about his emigration to the physicist Alfred Landé (1888–1975), who had lived in the U.S. since 1931:

"Intellectually it is very disappointing. This country is still very far from being a civilized nation. The government is reform–conscious but the people are not backing it at all. The university reform lacks the support of intellectually interested social classes, even though it is carried out with great vigor. I can speak very little Turkish; every lecture is accompanied by an interpreter who translates each sentence individually into Turkish. ... Additionally there is a pretty ugly nationalism in the country and also in the student body who, for instance, also voice a less welcoming anti–Semitism. ... You write that you will soon become an American citizen; that speaks for the great advantages of a country like the USA and that one can readjust one's whole life to a new country. Here such a naturalization is not at all desirable." [Landé Papers]

Cultural Dimensions

Between the wars the German capital, Berlin, was a cultural center of wide–ranging influence. It excelled in almost all areas of cultural and scientific production. Quite a few among the mathematicians who had to leave in 1933 or were stigmatized participated in Berlin's cultural life, often in ways quite unrelated to their profession; their expulsion contributed to the decline of the German culture. Such activities included

- Richard von Mises' studies of the work of Rainer Maria Rilke (see Poster 5),

- the lectures and articles on the history of music by the logician Leopold Löwenheim (see Poster 18),

- the public effect of the *Gesellschaft für empirische Philosophie* in Berlin (see Poster 19),

- the literary endeavours of Felix A. Behrend,

- the political activities of Kurt Grelling (see Poster 15),
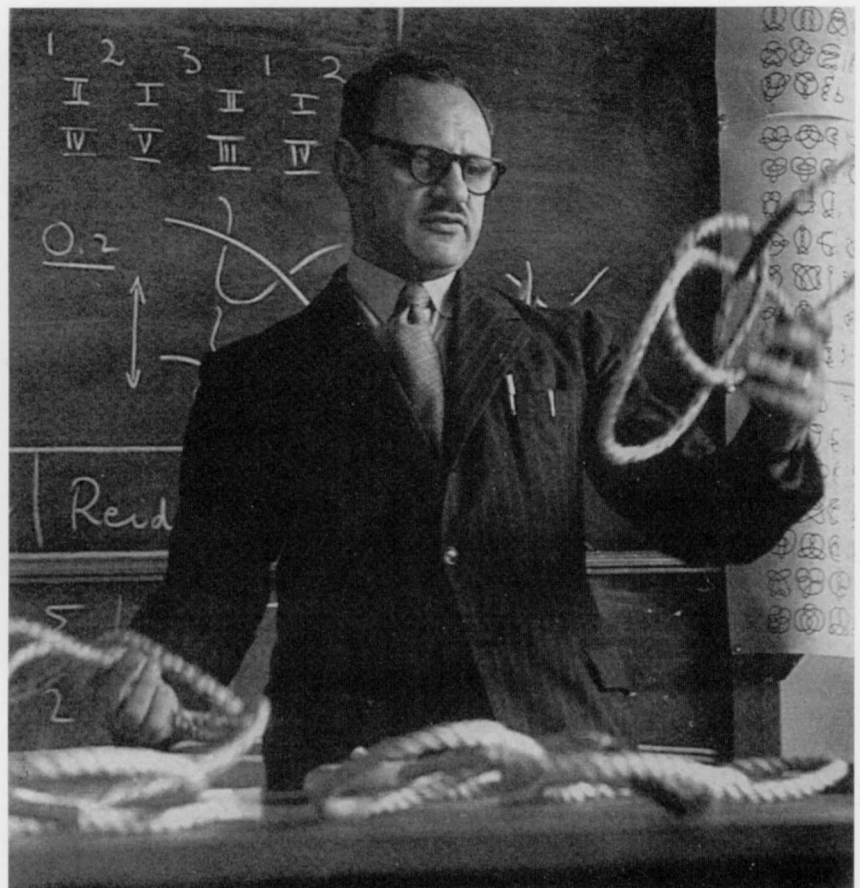
Kurt August Hirsch

- the Jewish studies of Feodor Theilheimer (see Poster 13),

- the presentations of pianist Richard Rado (see Poster 11),

- the appearances of the former chess world champion Emanuel Lasker,

- the journalistic activities of Kurt Hirsch at the *Vossische Zeitung* (see Poster 11),

- the widespread pedagogical effect of mathematics teachers such as Walther Jacobsthal and Felix W. Behrend (see Poster 18).

Kurt Hirsch (1906–1986), who started his significant group theoretical studies only after his emigration to England, recollected in 1986 about his activities for the Vossische Zeitung until March 1934: "For a year and a little bit more it (the journal) had struggled under Hitler — keeping up its prestige and also devoting more space to cultural rather than political matters. So I had a weekly full page in which I reported on progress in mathematics or the sciences or philosophy. I would write around and ask Heisenberg and Schrödinger to write and indeed they did. Every week there was at least one substantial article of lasting interest. Well, at the end of March, 1934, the newspaper folded up, and I immediately went to England." [Hir 1986; 43]

Prof. Max Oppenheimer (MOPP)

Emanuel Lasker
New York 1940

Emanuel Lasker (1868–1941), born in Berlinchen near Berlin was a student of Max Noether in Erlangen and became known in mathematics for his decomposition theorem in the theory of ideals (1902). His mathematical fame was clearly outshone by his success as a chess player, especially as world champion until 1921. Although Lasker spent the main part of his life abroad (in England, USA, and later, at times, in the Soviet Union) just in the years before the Nazi takeover he was in Berlin as he owned property nearby (Thyrow). He had to leave his home country and found asylum in the Soviet Union where he became again mathematically active in the Academy. He finally emigrated to the United States in 1937.

Albert Einstein wrote in 1952 about Lasker: "I liked Lasker's unwavering independence, a quality very seldom found in a human being, whilst most of them, even the intelligent people, belong to a class of followers." [Han 1952; 4]

Albert Fleck (1861–1943) studied mathematics and physics for eight semesters. He then turned to medicine for another eight semesters and finished with the medical state examination at the University of Berlin. Working as a doctor, Fleck was also an active and publishing member of the *Berliner Mathematische Gesellschaft.* He was entrusted with the honorary task of scrutinizing attempts, submitted to the Berlin mathematicians, to resolve the famous Last Theorem of Fermat. In 1914 Fleck received the silver Leibniz medal of the Prussian Academy of Sciences for this work. But after 1933, the Jew Fleck had to leave the BMG and suffered humiliation and persecution. [Bier 1987], [Stü 1997]

Two Berlin mathematicians from different generations, the applied mathematician Richard von Mises, born in 1883, and the number theorist Felix A. Behrend, born in 1911, were more closely associated with German art, especially German literature, than the average of their colleagues.

Richard von Mises was an internationally known authority on the famous poet Rainer Maria Rilke (1875–1926), who was Austrian too. He had similar experiences of national rootlessness as von Mises and expressed this in his work. His poetry strived for an "enhancement of the senses" by means of language and attempted to contrast the abstraction of a technical world with a new lyrical immediacy. Richard von Mises' extensive collection of works from and about Rilke are now kept at the Houghton Library of Harvard University. [Mis 1934], [Mis 1935], [Mis 1947]

Page 52: In an historical article in the Vossische Zeitung K. Hirsch mentions the emigration of Otto Neugebauer from Göttingen. Neugebauer was the first to decipher the mathematical cuneiform tables of the babylonians.

Forschung

Mathematik am Euphrat und Nil

> Dem ersten, der den gleichschenkeligen Triangel demonstrierte (er mag nun Thales oder wie man will geheißen haben), dem ging ein Licht auf.
>
> (Kant, Vorrede zur 2. Ausgabe der Kritik der reinen Vernunft.)

Eine allzu vereinfachende Geschichtschreibung früherer Zeiten ließ mitunter die Mathematik ziemlich unvermittelt, wie aus dem Haupte des Zeus, im sechsten vorchristlichen Jahrhundert bei den ionischen Griechen entstehen. Thales und Pythagoras, beide noch mit sagenhaftem Dunkel umhüllt, werden als die ersten Mathematiker genannt. Längst haben reiche Funde von ägyptischen Papyri und babylonischen Keilschrifttexten mathematischen Inhalts diese Auffassung gründlich überwinden helfen. Aber gerade unsere verfeinerten Kenntnisse der mathematischen Leistungen im ägyptischen und babylonischen Kulturkreis lassen das eigentliche Verdienst der Griechen um so deutlicher hervortreten: die Mathematik als Wissenschaft begründet zu haben. Als Wissenschaft; denn sie zuerst haben Gefühl für die Möglichkeit und Notwendigkeit mathematischer Beweisens gehabt. Und mit dem Beweisen, dem Deduzieren aus Prämissen, beginnt die wissenschaftliche Mathematik.

Was allerdings die Griechen bei der Berührung mit der ägyptischen und den mesopotamischen Kulturen an mathematischen Kenntnissen übernehmen konnten, ist erstaunlich. Der berühmte Papyrus Rhind, das Rechenbuch des Ahmes, zeigt das Umgehen mit den vier elementaren Rechenoperationen, die Lösung linearer Gleichungen usw. Die Inhalte ebener Figuren werden durch genaue oder gute Näherungsformeln bestimmt; die Zahl Pi wird mit 3,16 approximiert. Ein eigenes Wort existiert für das, was wir heute den Kotangens eines Winkels nennen. Ein mathematischer Papyrus (aus der Zeit um 1800 v. Chr.), der im Moskauer Museum aufbewahrt wird und von Prof. W. Struve (Leningrad) vor wenigen Jahren herausgegeben wurde, enthält „das Glanzstück der ägyptischen Mathematik": die Formel für das Volumen des Pyramidenstumpfs mit quadratischer Grundfläche. Eine Vermutung, die Aegypter hätten gewußt, die Oberfläche der Halbkugel doppelt so groß ist wie die Fläche des Hauptkreises, scheint sich nicht zu bestätigen.

Von babylonischer Mathematik war noch vor wenigen Jahren trotz der Entzifferung der Keilschrift nicht sehr viel bekannt. Man wußte, daß die Babylonier ein Zahlsystem mit der Grundzahl 60 benutzten, das keine Null hatte, wohl aber Stellenwert; daß sie Tafeln für die Quadrat- und Kubikzahlen und besondere Multiplikationstabellen besaßen; daß sie elementare Flächen- und Volumen-Bestimmungen durchführen konnten. Ein eigentliches Verständnis des Inhalts der mathematischen Keilschrifttexte scheiterte meist daran, daß die Mathematiker nicht genug Assyriologie, die Assyriologen nicht genug Mathematik beherrschten.

Seit knapp zehn Jahren arbeitet nun Professor Otto Neugebauer (der jetzt in Kopenhagen wirkt) mit größtem Erfolg an der Entzifferung und Interpretation der babylonischen Mathematik. Durch seine Befunde, die im folgenden kurz dargestellt werden sollen, ist es überhaupt erst möglich geworden, in der vorgriechischen Mathematik von Niveau und Stil zu sprechen.

Zunächst einmal hat Neugebauer die eigentliche babylonische Rechentechnik herausgefunden, die so elegant war, daß Zahlen bis in die Millionen ohne jede Mühe bewältigt wurden. Die Vorteile des Sexagesimalsystems beruhen ja in der Hauptsache darauf, daß 60 sehr viele Teiler hat, daß also viele Brüche im Sexagesimalsystem bequem auszudrücken sind (wie im Dezimalsystem diejenigen, deren Nenner nur Potenzen von 2 und 5 enthalten). Diese Tatsache wurde in der babylonischen Mathematik bis ins feinste ausgenützt. Die früher unverstandenen Multiplikationstabellen dienten, wie Neugebauer gezeigt hat, gar nicht zur Auffindung beliebiger Produkte zweier ganzer Zahlen, sondern sind auf das Grundproblem der sexagesimalen Bruchrechnung zugeschnitten. Mit Systemen linearer Gleichungen konnten die Babylonier ohne weiteres umgehen; quadratische Gleichungen, auch mit mehreren Unbekannten, wurden genau so behandelt, wie wir es machen. Für kubische Gleichungen fehlte die allgemeine Auflösungsformel, die ja erst im späten Mittelalter gefunden wurde. Die Auflösung solcher Gleichungen wurde aber durch geschickt angelegte Tabellen „erzwungen". Arithmetische und geometrische Reihen sind dauernd anzutreffen. Es ist sehr wahrscheinlich, daß die Summenformeln in geschlossener Form bekannt waren. Neuerdings wurde sogar die Formel für die Summe der Quadratzahlen

entdeckt, die bei uns nur den wenigsten Abiturienten bekannt sein dürfte. Alle diese Aufgaben werden meist in eingekleideter Form gestellt: es gibt „Belagerungsrechnungen", die sich mit Wall und Graben und Toren einer feindlichen Stadt beschäftigt und meistens auf Trapezaufgaben hinausläuft; es gibt „Verteilungsaufgaben" wie bei den Aegyptern usw. Manche Aufgaben erscheinen in reiner abstrakter Form. Eines ist bei den ganzen babylonischen Arithmetik und Algebra auffällig; es fehlt jegliche Beziehung auf die Astronomie, die doch in Babylon, freilich erst im letzten vorchristlichen Jahrtausend, eine imponierende Höhe erreicht hat.

Auch in der Geometrie waren die Babylonier erstaunlich weit. Daß der „Pythagoräische" Lehrsatz und der Satz „des Thales" zum gesicherten Besitz der babylonischen Mathematik seit der ältesten Zeit gehört, ist nicht mehr zu bezweifeln. Die Berechnung von Hypotenusen rechtwinkliger Dreiecke, deren Katheten gegeben sind, führt zu Näherungsformeln, die bei weiterer Bearbeitung in Gedankengänge, die Archimedes bei seiner berühmten Approximation der Wurzel aus 3 geleitet haben mögen. Die Formel für den quadratischen Pyramidenstumpf findet sich auch in Keilschrifttexten. Ja, das geometrische Wissen war derart durchgearbeitet, daß Neugebauer zu dem Urteil kommt, Herons Stereometrie lese sich „wie ein durch einige Archimedes-Zitate aufgeputzter Keilschrifttext".

So weit das Tatsächliche. Nirgends findet sich in dem großen Material auch nur die Andeutung eines Beweisens, nirgends ein Hinweis auf Zusammenhänge zwischen verschiedenen geometrischen Beziehungen, was ja eine Vorstufe zum Beweisen darstellen würde. Stets heißt es einfach im Text: „So ist das Verfahren". Eine gefestigte mathematische Tradition in diesem Sinne scheint sich über anderthalb Jahrtausende erstreckt zu haben. Denn von Hammurabi bis zur Perserzeit ist die babylonische Mathematik ziemlich stationär geblieben. Von den Keilschrifttexten ist zwar kein einziger datiert; aber der Schriftcharakter, die Tafelform usw. lassen eine ungefähre zeitliche Anordnung durchführen, und hierbei zeigt sich eben, daß in den ältesten Texten, die um 2000 v. Chr. entstanden sind, schon ungefähr dieselbe Mathematik zu finden ist wie in den späteren.

Gerade diese ältesten Texte sind auch für die Frage nach der Herkunft der babylonischen Mathematik sehr aufschlußreich. Denn was unter dem Sammelnamen „Babylonier" erfaßt wird, ist ja ein Völkergemisch von Akkadern, Sumerern, Kassiten usw. Es scheint nun, daß die Sumerer (die nicht indogermanische und nicht semitische Urbevölkerung von Südmesopotamien) das eigentlich treibende Element in der mathematischen Entwicklung Babylons darstellten. Die Sprache schon der ältesten Texte zeigt deutlich sumerische Einflüsse.

Ein Vergleich zwischen der babylonischen und der ägyptischen Mathematik, die ungefähr gleich alt sind, fällt im großen und ganzen zugunsten der ersteren aus. Nicht so sehr, was die einzelnen Teilkenntnisse betrifft, die namentlich für die Geometrie in Aegypten teilweise sogar weiter reichten als im babylonischen Kulturkreis; sondern das allgemeine Niveau der babylonischen Mathematik liegt höher. Wenn man bei verschiedenen Texten analoge Partien nebeneinanderstellt, so gewinnt man einen Eindruck von dem, was als das eigentlich Mathematische an den verschiedenen Beispielen empfunden wurde.

Der letzte Ursprung der Mathematik überhaupt bleibt, auch wenn man ihre Anfänge um Jahrtausende zurückdatiert, dunkel wie der aller geistigen Leistungen des Menschen. Daß rein empirische Regeln des praktischen Lebens — man pflegte früher auf die Erfordernisse der Landmessung nach den jährlichen Nilüberschwemmungen hinzuweisen — sich allmählich in wirkliche Mathematik umgesetzt haben, diese bequeme Meinung eines aufgeklärten Zeitalters jedenfalls läßt sich nicht aufrechterhalten.

K. H.

Felix A. Behrend

Albert Einstein and Thomas Mann in exile
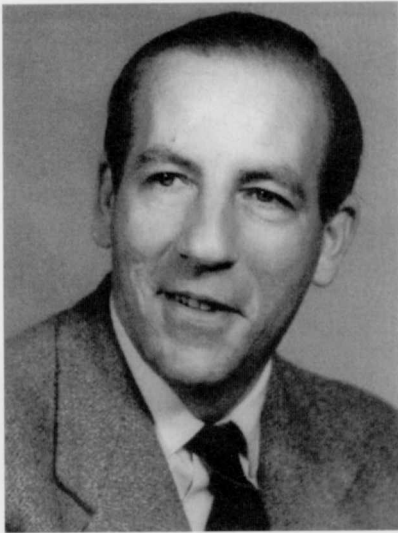
Felix A. Behrend (1911–1962) earned his degree in 1933 with a thesis on *numeri abundantes*. In the *Herder Reform–Realgymnasium* he had been taught, together with Bernhard H. Neumann, by his father Felix W. Behrend, well–known pedagogue and teacher of mathematics and physics. Father and son were forced to emigrate. Felix A. Behrend took to writing belletristic works during his emigration. He was strongly influenced by Thomas Mann whom he highly admired; but he also wrote the children's book *Ulysses' Father* (published 1962). He tried to establish contact with Thomas Mann from Prague, one of the stations during his eventful journey into emigration. He received some encouragement in his literary endeavours from Mann and visited him in 1954 in Zürich. A nineteen–page report about his contacts with Thomas Mann is now kept in the *Thomas–Mann–Archiv* in Zürich. Behrend was deported to Australia from England as an "enemy alien". He expresses his sadness about the separation from the European culture in the aforementioned report. [Thomas–Mann–Archiv]

In the middle of the 1930's, in Prag, the student of mathematics Maximilian Pinl shared a room with Behrend for seven semesters, at Behrend's cost. In his report *Kollegen in einer dunklen Zeit* (1969) he remembered:

"We read — no, we studied — German literature, i.e. mainly the works of Thomas Mann. 'Where I am, there is the German culture' ('Wo ich bin, dort ist die deutsche Kultur.') — we had never felt so deeply abouth this statement made by Thomas Mann as at that time. Thomas Mann, who had already been deprived of his German citizenship, came to a lecture in Prague." [Pin 1969; 174]

Thomas Mann wrote on February 13, 1937, in response to Behrend: " All that I can do is to thank you in brief words for your very friendly and interesting present, this beautiful fragment of a spiritual autobiography so curiously associated with my own work. When you continue this work and continue also to take me into your confidence, you can be sure that you will have an attentive reader, impressable by the beautiful human values which you convey. Your very loyal Thomas Mann." [Thomas–Mann–Archiv, F.A. Behrend report, p.3]

After his deportation to Australia, in the internment camp Hay, a camp school was set up in 1940. A report mentions Behrend's activities:

"On December 10, 1940, a meeting of the Fachschaft Naturwissenschaften was to be held in Hay Camp 7. Its agenda contained a report on the current semester and a plan for the next; the meeting was convened by the mathematician Felix Behrend who had been a driving force in the running of the school at Camp 7." [Lau 1997; 111]

Later, F. Behrend wrote to Thomas Mann in America on January 31, 1941:

"I don't know if you ever received the second part of my letter; the final part was short of completion as I, in June of last year, like many other refugees, was interned and — by error or by accident — sent to Australia, just at the moment in which I was preparing for and familarizing myself with a very unattractive voluntary military service. My request for release (as scientist) has been granted in the meantime, however, my release can only take place in England and I see no real sense in returning to England, where I didn't have any employment at all and now have, after all the news, even less a prospect of useful occupation. ... For this reason I would like to apply for an extra

quota visa for the USA (I hear that this possibility was recently made available to scientists) and I dare to request your assistance in this matter, so immodest as it may be. I also assume that Prof. Weyl and Dr. A. Brauer in Princeton and other mathematicians who are acquainted with my case would do their utmost for me."

Behrend received no reply "presumably due to censorship reasons", as he remarked. [Thomas–Mann–Archiv, F.A. Behrend report, p.4]

From Melbourne, on November 25, 1944, he wrote again to Thomas Mann: "There are so few people whom one can speak to — especially here and now where one is fully cut-off from all German traditions. There are some — but very few — 'cultured people'

who cherish what they have rescued from their home country, scanty belongings and perhaps a library and nostalgic memories, chattels of the soul and of everyday life, but this type of cherishing is only a loving and gentle lamenting 'caring to death'." [loc. cit, p.8]

Cherry and Neumann (1964) comment about Behrend as a mathematician: "Behrend was an unusually versatile mathematician. ... In his earlier years he published chiefly on theory of numbers, and in his later years on foundations and topological spaces (axiomatics), ... but it is possible that the deep disturbances of his life during the pre–war and war years — he was uprooted six times — may have prevented the concentration of his energies into one deep channel." [Che/Neu 1964; 265/66]

Lost Tracks

The unknown Destinies of Mathematicians expelled from Berlin

Almost all of the mathematicians under consideration who after persecution and expulsion survived the Third Reich and the War have made a remarkable career. But it is in the nature of historiography that the list comprises, above all, the successful and hence visible people.

About the mathematics teacher **Charlotte Hurwitz**, born in Berlin in 1889, we only know that she worked as an administrative employee at the *Jüdische Kultusvereinigung* (Jewish Association for Cultural Affairs) in Berlin in 1941 after her dismissal from the school system. [letter 4]

Of others, such as Walther Jacobsthal, Hans Baerwal, or Michael Lotkin, we have only a few traces, which again indicate successful careers in the United States of the latter two (according to *American Men and Women of Science*) at General Electrics. Other expelled mathematicians, like Rose Peltesohn, apparently left the field of mathematics completely.

The known sources are scarce:

Walther Jacobsthal (born in **1876** in Straßburg): "Walther Bruns was known in the German educational world as Walther Jacobsthal. He occupied important positions as director and administrator of schools in Berlin and as a lecturer on mathematical education. He is at present living in Syracuse."

[Dre 1942; 423]

Michael (Max) Lotkin (born in **1911** in Copenhagen): "I decided to become a high school teacher (Studienrat) and therefore studied mathematics and physics at the Faculty of Philosophy of the University of Berlin. ... On account of the decrees of the new German government I was not eligible for admission to the teacher's examination, and I therefore decided to take a doctor's degree. I submitted my dissertation ('Über gemischt lineare Integralgleichungen') early in 1935 to the university of Berlin, but as a consequence of tremendous difficulties and extremely base chicaneries on the part of the Reichs Ministry and of certain professors I was not admitted to the examination until early 1937 [in Kiel?]. ... Since my prospects in Germany were very poor, I decided to immigrate to the United States." [Shapley Papers]

"Michael Lotkin supplemented his work at Kiel, where he received a doctor's degree, by courses at New York University and he is now teaching at the Tilden High School in Brooklyn." [Dre 1942; 420]

Rose Peltesohn (born in **1913**, Schur student, now living in Tel Aviv): "Today, thirty–five years later, her two papers still attract considerable attention. It appears that she did not resume her mathematical career in Israel." [Pi/Fu 1973; 175]

The main building of the University after the war

After the War

Of the 44 emigrants from Berlin who have been mentioned here only one returned to Germany for good, the statistician Karl Freudenberg (1892–1966), see Poster 16. He became the first professor for medical statistics at the Freie Universität Berlin, founded in 1948. [IBD]

The reparation claims made by emigrants were partly impeded by the bureaucratic behaviour of the German authorities so that, for instance, Richard von Mises who died in Boston in 1953, didn't live to see any reparation (see Poster 6). Incriminated German mathematicians, such as Bieberbach, were, in some cases, called upon as assessors in the reparation procedure.

Emigrants from Berlin took part in diverse ways in renewing international contacts to German mathematics. [Sie 1998] This happened, for example, in tours of inspection immediately after the war (Bernhard H. Neumann was a member of the Intelligence Corps of the British Army in 1945 [letter 7]) or by visiting professors to Berlin like Ernst Jacobsthal.

The establishment of connections of emigrants to

East Germany was severely hampered by reparation difficulties and by the Cold War. When nominated to become an external member of the East German Academy of Science, von Mises replied:

"Pierce Hall, Cambridge 38 Mass.
15. September 1950

Dear Colleague: Your friendly letter from July 9 has just reached me with very great delay, as it was incorrectly addressed. I thank you for your notification and am honored beyond merit to be nominated as external member of the Academy. I would very gladly accept the nomination in remembrance of my teaching activities in Berlin and thus re–establish the bond which connected me for a long time to the German scientific life. Unfortunately the present circumstances in Germany as well as those in this country are such that the acceptance of such a distinction could be interpreted as a political demonstration on my part. I am aware that such an interpretation is unwarranted, but it has actually been expressed in several newspapers and by the american authorities. I have made it a rule in my life to keep away from any

Page 56: Letter Bundesministerium des Innern

DER BUNDESMINISTER DES INNERN

Gesch. Z. **VII W 2 - 15.1.Mi.**

Bei allen Antwortschreiben wird um Angabe obiger
Geschäftsnummer gebeten.

BONN, den **22. Januar 1957**

Rheindorfer Straße 198 (Postfach)
Fernruf: 3 01 41

Herrn
Professor
Dr. Ludwig Bieberbach

Berlin-Dahlem
Gelfertstr. 16

Sehr geehrter Herr Professor!

    Frau Dr. Hilda von Mises geborene Geiringer (geschiedene
Pollaczek) hat Antrag auf Wiedergutmachung nationalsozialisti-
schen Unrechts gestellt und angegeben, daß Sie in der Lage
seien, sich über die akademische Laufbahn, die sie ohne Da-
zwischentreten der Nationalsozialisten, voraussichtlich in
Deutschland genommen hätte, zu äußern.

    Frau Dr. von Mises hat ausgeführt, sie sei von 1921 bis
1933 Assistentin bezw. planmäßige Oberassistentin und seit
1927 Privatdozentin an der Universität in Berlin gewesen und
habe im November 1933 Deutschland verlassen müssen.

    Da sie hinsichtlich des voraussichtlichen Verlaufs ihrer
akademischen Laufbahn, die nach ihrer Ansicht zu einer ordent-
lichen Professur geführt hätte, keine Beweismittel vorlegen
kann, wäre es im Interesse einer gerechten Entscheidung über
den Umfang der Wiedergutmachung von großer Bedeutung, wenn
Sie auf Grund Ihrer Kenntnisse der wissenschaftlichen Leistung
der Eignung zum Lehrberuf und der Persönlichkeit der Frau
Dr. von Mises zu dieser Frage sich eingehend äußern würden.

    Für Ihre Bemühungen danke ich im voraus bestens.

                         Hochachtungsvoll
                           Im Auftrag

                           gez. Dr. Pfister

Beglaubigt:
Angestellter

political activity and not to belong to any association that is in anyway engaged in political ideologies. I am very sorry but because of this I feel obliged to decline this honorable nomination. I do this with the greatest of regret and with full consciousness that it is a great loss for me. I request you to inform the members of the Academy that my respect for the Academy is undiminished and that I only relinquish acceptance of this nomination under the pressure of outward circumstances, a nomination which I regard as a great honor in every respect.

With deepest respect
Your very loyal R. v. Mises" [Schröder Papers]

Bernhard H. Neumann becomes honorary doctor at the Humboldt–Universität in 1992

Carl Gustav Hempel becomes honorary doctor at the University of Konstanz in 1991

Carl–Gustav Hempel was awarded an honorary doctorate in the field of philosophy by the University of Konstanz (1991). Ernst Jacobsthal became an honorary citizen (1952) and Richard Rado an honorary doctor at the Freie Universität (1981).

Bernhard H. Neumann became an honorary doctor at the Humboldt–Universität in 1992. He wrote in a letter of August 22, 1993:

"I was never approached officially about returning to Germany, though many friends asked me if I would. I have often been back to Germany, a country I love to visit because I still have family and friends there, and because I can speak the language, but where I could not envisage to live." [letter 7]

Felix A. Behrend, who was expelled from Berlin, spoke about his conversation with Thomas Mann on 26 June 1954 in Zürich:

"Thomas Mann said 'And now we have again found asylum here'. He argued clearly, almost passionately, against McCarthyism. 'It started in 1949,' he continued, amused by the memory, 'I played a trick on the Americans in that I went to Weimar in East Germany to Goethe's 200th birthday.' Thomas Mann showed an almost childlike pleasure of this coup. 'The persecution of the physicist Oppenheimer,' I said, 'reminded me of Einsteins' similar lot in Berlin. That was the time of anti–Semitic riots at the University of Berlin [1929] ... Einstein had held a beautiful lecture for the *Mathematisch-Physikalische Arbeitsgemeinschaft*. ... Einsteins lecture was so successful that it was decided that it would be repeated. But riots broke out again and Mrs. Einstein called off the lecture on the spot' ". Behrend then reported how he and a fellow colleague called upon Einstein personally in Caputh near Potsdam and how he reacted: "I know why you have come. ... Of course I will hold the lecture. You can count on it". [Thomas–Mann–Archiv, report F.A. Behrend, p.18]

Lists of Victims

The emigrés and persecuted persons in the following lists belong to the "first generation", i.e. received their mathematical training before expulsion Sources which are mentioned immediately below contain further information on the mathematicians included in the lists. In most cases there is also an entry in PF, which is mentioned in the lists below only if other sources are lacking. The sources used in this catalogue are cited on page 70.

Sources and Abbreviations

AC	American Council for Emigres in the Professions (contains archival sources)
AMWS	entry in *American Men and Women of Science*
CIP	Courant Institute Papers, New York
CP	Collected Papers exist
CPP	Courant Private Papers, Bayport, N.Y.
DSB	*Dictionary of Scientific Biography*
EC	Emergency Committee, New York, Refugee Files
FE	final country of emigration before 1945
HSP	Harlow Shapley Papers Harvard
IBD	*International Biographical Dictionary* Strauss/Röder 1983: for emigrés(!) without notice NIBD there is always an entry in IBD
JDMV	*Jahresbericht der Deutschen Mathematikervereinigung*
letter	private letter to R. Siegmund-Schultze exists
List of Displaced Scholars	recorded on list (1936) in [St/Bu/Dü1987].
Microfilm	informations for the person mentioned on microfilm belonging to Strauss/Röder
NDB	*Neue Deutsche Biographie*
NE	non–emigré
NIBD	no entry in Strauss/Röder
NJ	not Jewish,
OVP	Oswald Veblen Papers, Washington
PF	Pinl/Furtmüller [Pi/Fu 1973]
Rockef.	Rockefeller–list of 56 dismissed mathematicians (1933), in Rockefeller Archive Center, Tarrytown, NY
Rt	returned to Germany after 1945
Spalek	Guide to the Archival Materials of the German–speaking Emigration to the United States after 1933
SR	Spouse subject to racist persecution

List of Expelled Berlin Mathematicians (First Generation)

No.	Name	Dates	Insti-tution	FE before 1945	Remarks, Sources
1	Baerwald, Hans	1904–1987	Industry	1939 US	NIBD, Microfilm, PF, Spalek, AMWS 11 (1965)
2	Barneck, Alfred (till 1923 Baruch)	1885–1964	TH/School	NE	NIBD, PF
3	Behrend, Felix A.	1911–1962	Uni 1940	Austral.	[Che/Neu 1964]
4	Behrend, Felix W.	1880–1957	School	1938 GB	[Che/Neu 1964], father of F.A.B.
5	Bergman, Stefan	1895–1977	Uni	1939 US	DSB (Suppl), [Schi/Sa 1979]
6	Brauer, Alfred	1894–1985	Uni	1939 US	
7	Caemmerer, Hanna von (marr. Neumann)	1914–1971	Uni	1938 GB	NJ, SR; [New/Wa 1974]; [Led 1983], CP (1988), IBD–Microfilm
8	Cohn, Arthur	1894–1940	School	1940 Palest.	[Led 1983]; [Toe 1991; 73]
9	Dubislav, Walter	1895–1937	TH	1936 CSR	NJ, [Thie 1984], [Dan 1994]
10	Fleck, Albert	1861–1943	Physician	NE	[Bier 1987], [Stü 1997]
11	Freudenberg, Karl	1892–1966	Uni	1939 Netherl.	Rt
12	Frucht, Robert	1906–?	Uni	1938 Chile	NIBD, PF; [Fru 1982], expelled in Italy 1938, where Frucht worked since 1931
13	Fuchs, Richard	1873–1945	TH	NE	NDB; [Har 1964]; Rockef.; letter B. Jaeckel (1998)
14	Geiringer, Hilda(marr. von Mises)	1893–1973	Uni	1939 US	HSP; EC; OVP; [Rich 1987]; [Bin 1992]; [Sie 1993b];
15	Görke, Lilly (born Buchhorn)	1904–1992	School	NE	Interview and letter (1986); [Pie 1992]
16	Golomb, Michael	1909–	Uni	1939 US	HSP, OVP, letters (1993/98)
17	Grelling, Kurt	1886–1942	School	1939 Belgium	NIBD, [Thie 1984], [Peck 1994], murdered
18	Helmer–Hirschberg, Olaf	1910–?	Uni	1936 US	OVP, EC, AMWS 14 (1979)
19	Hempel, Carl G. (Philosopher)	1905–1997	Uni	1937 US	NJ; [Thie 1984], TIMES 9.12.97, later
20	Herzog, Fritz	1902–?	Uni	1933 US	NIBD, IBD–Mikrofilm, PF, [Dre 1942; 417]; AMWS 19 (1995/96)
21	Hirsch, Kurt	1906–1986	Vossische Zeitung	1934 GB	[Hir 1986]; [Gru 1988]
22	Hirschfeld, Kurt (since 1938 Hartley)	1912–1980	Uni	1935 GB	[Dav 1982]
23	Jacobsthal, Ernst	1882–1965	TH	1934 Norway/(Sweden)	NDB; [Sel 1965]; [Lo 1992], [Kno 1998]
24	Jacobsthal, Walther (Bruns)	1876–?	School/TH	1939 US	NIBD; OVP; [Dre 1942; 423]; [Toe 1991; 177]
25	Jacoby, Walter	?	School (?)	1939 US	[Dre 1942; 424], teacher (?)
26	Kahn, Margarete	1880–1942	School	NE	[Tob 1997; 50]; murdered
27	Korn, Arthur	1870–1945	TH	1939 US	NDB, [Weih 1983], [Lit 1993]
28	Lasker, Emanuel	1868–1941	private	1937 US	[Han1952]

29	Ledermann, Walter	1911–	Uni	1934 GB	[Led 1983]; [Gai/Laf 1985]; letter (1997), living in London
30	Levin, Victor	1909–1986	TH	1938 SU	NIBD; List of Displaced Scholars, Uspechi Mat. Nauk 25, No.1, 205–210
31	Löwenheim, Leopold	1878–1957	school	NE	DSB (Suppl); [Thie 1975]
32	Lotkin, Michael (Max)	1911–?	Uni	1937 US	NIBD; HSP (photo); [Dre 1942; 420]; AMWS 14 (1979)
33	Mises, Richard von	1883–1953	Uni	1939 US	DSB, NDB; [Ber 1980], [Fra 1954], Mises Papers Harvard, Spalek, [Bier 1988]
34	Müntz, Chaim H.	1884–1936	Industry	1933 SU	NIBD; PF; HSP; OVP
35	Naas, Josef	1906–1993	Aviation Ministry	NE	NJ; [Gä 1993]
36	Nemenyi, Paul	1895–1952	TH	before 1941 US	Rockef., List Displ. Scholars; Microfilm; [Dre 1942; 422]
37	Neumann, Bernhard H.	1909–	Uni	1933 GB	OVP; CP (1988), [Led 1983]; letters (1993/1998), living in Canberra, Australia
38	Neumann, Johann von	1903–1957	Uni	1933 US	NIBD, DSB, PF, AC, [Bier 1988]; CP (1961–63); [Ul 1958], [Hal 1979]
39	Ornstein, Wilhelm	1905–?	Industry	1939 Turkey	AMWS 19 (1995/96), mathematics of engineering
40	Peltesohn, Rose	1913–	Uni	1938 Palest.	NIBD, PF, living in Tel Aviv; no response to letter 1998
41	Pollaczek, Felix	1892–1981	Reichspost	1939 France	NIBD; HSP; OVP; [Coh 1981]; [Schrei/LeGall 1993]
42	Rado, Richard	1906–1989	Uni	1933 GB	[Rog 1991]
43	Reichenbach, Hans	1891–1953	Uni	1938 US	DSB, AC, Spalek; [Dan 1994]; philosopher of mathematics and science
44	Reissner, Erich (Eric)	1913–1996	TH	1936 US	letter (1994); Notices AMS 44 (1997); [Rei 1977]
45	Reissner, Hans	1874–1967	TH	1938 US	letter from Eric Reissner (1994); [Rei 1977]; mechanics and applied mathematics
46	Remak, Robert	1888–1942	Uni	1939 Netherl.	PF, OVP, HSP; [Bier 1988]; [Mer 1992]; [Ding 1945]; murdered
47	Rembs, Eduard	1890–1964	TH, Uni, School	NE	NJ, PF, [Kno 1998]
48	Sadowsky, Michael	1902–1967	TH	1931/33 US	NJ (?); SR; teaching permit revoked 1933; [Kno 1998]
49	Schiffer, M. Max	1911–1997	Uni	1933 Palest.	[Ding 1945]; [Schi/Sa 1979]
50	Schur, Issai	1875–1941	Uni	1939 Palest.	DSB, CP (1973); [Bra 1973]; [Led 1983]; [Bier 1988]
51	Sperling, Käte (marr. Fenchel)	1905–1983	School	1933 Denm./ (Sweden)	NIBD; [Hoy 1987]; [Jes 1993]
52	Theilheimer, Feodor	1909–	Uni	1937 US	NIBD, [Dre 1942; 421]; AMWS 19 (1995/96) ; letter from Rachel Theilheimer (1997, photo); is living in Las Cruces, US
53	Wagner, Karl Willy	1883–1953	TH	NE	NJ, [Rür 1979], [Weih 1983]

List of Emigrants among all
German–Speaking Mathematicians (First Generation)

No.	Name	Dates	FE before 1945	Place of expulsion	Remarks, few selected sources
1	Alt, Franz	1910–	Vienna	1938 US	AC, letters (1993/97). living in NY City
2	Artin, Emil	1898–1962	Hamburg	1937 US	NJ, SR, Rt, DSB, Spalek
3	Artzy, Rafael	1912–	Königsberg	1933 Palest.	letter (1997), is living in Haifa (Israel)
4	Baer, Reinhold	1902–1979	Halle	1935 US	Rt
5	Baerwald, Hans	1904–?	Berlin	1939 US	NIBD, Microfilm, PF; EC; Spalek
6	Basch, Alfred	1882–1958	Vienna	1938 US	Rt; HSP; OVP
7	Behrend, Felix A.	1911–1962	Berlin	1940 Australia	[Che/Neu 1964]
8	Behrend, Felix W.	1880–1957	Berlin	1938 GB	[Che/Neu 1964], father of F.A.B.
9	Bergman, Gustav	1906–1987	Vienna	1938 US	NIBD, PF; HSP; OVP, later philosopher
10	Bergman, Stefan	1895–1977	Berlin	1939 US	EC; OVP; [Schi/Sa 1979]; DSB (Suppl)
11	Bernays, Paul	1888–1977	Göttingen	1934 Switzerl.	DSB (Suppl); HSP; OVP
12	Bernstein, Felix	1878–1956	Göttingen	1933 US	DSB; EC; EP; OVP
13	Bers, Lipman	1914–1993	Prague	1940 US	NIBD, PF; OVP; Notices AMS 42 (1995), 8–25.
14	Bing, Kurt	1914–1997	Köln ?	1938 Palest.	letter Mrs. P. Bing (1998)
15	Bochner, Salomon	1899–1982	Munich	1933 US	DSB (Suppl); EC
16	Boll, Ludwig	1911–1985	Frankfurt	1934 Neth.	Rt, 1983 Interview
17	Brauer, Alfred	1894–1985	Berlin	1939 US	[Roh 1988]; HSP; EC; OVP
18	Brauer, Richard	1901–1977	Königsberg	1935 Canada	DSB (Suppl); EC
19	Breuer, Samson	1891–1974	Karlsruhe	1933 Palest.	NIBD, PF
20	Breusch, Robert	1907–1995	Freiburg	1939 US	NJ (?), SR, Notices AMS 42 (1995)
21	Busemann, Herbert	1905–1994	Göttingen	1936 US	AC, CPP, Notices AMS 41 (1994)
22	Caemmerer, Hanna (marr. Neumann)	1914–1971	Berlin/ Göttingen	1938 GB	NJ, SR, [New/Wa 1974]; [Led 1983]
23	Cohn–Vossen, Stefan	1902–1936	Köln	1935 SU	Uspechi Mat. Nauk 2 (1947), No.3, 107–141
24	Courant, Richard	1888–1972	Göttingen	1934 US	Spalek, CPP; EC; OVP; CIP
25	Dehn, Max	1878–1952	Frankfurt	1941 US	DSB, AC, Spalek, OVP; Dehn Papers Austin,; EC
26	Dubislav, Walter	1895–1937	Berlin	1936 CSR	NJ, [Thie 1984]
27	Fanta, Ernst	1878–1939	Vienna	1939 Brazil	NIBD, [Ein 1985]
28	Feller, Willy	1906–1970	Kiel	1939 US	DSB (Suppl), Annals Mathematical Statistics 41 (1970); CPP
29	Fenchel, Werner	1905–1988	Göttingen	1933 Denm./ (Sweden)	OVP; [Jes 1993], Notices AMS 35 (1988)
30	Fraenkel, Adolf	1891–1965	Kiel	1933 Palest.	DSB, CPP
31	Freudenberg, Karl	1892–1966	Berlin	1939 Neth.	Rt

32	Freudenthal, Kurt (Fulton)	1910–	Munich	1938 Colomb.	letter (1994)
33	Fried, Hans	1893–1945	Vienna	US	NIBD, Microfilm; EC; OVP; [Dug/Dru 1948]; HSP, teacher
34	Friedrichs, Kurt	1901–1982	Braunschweig	1937 US	NJ, SR, Spalek, CPP; EC
35	Frucht, Robert	1906–?	Berlin	1938 Chile	NIBD, PF; HSP; OVP, [Fru 1982], emigration from Italy
36	Geiringer, Hilda	1893–1973	Berlin	1939 US	HSP, EC, OVP, [Rich 1987], [Bin 1992], [Sie 1993b]
37	Gödel, Kurt	1906–1978	Vienna	1940 US	DSB (Suppl), NJ, AC; EC; [Ein 1985]
38	Golomb, Michael	1909–	Berlin	1939 US	letters (1993/98); HSP; OVP
39	Gumbel, Emil J.	1891–1966	Heidelberg	1940 US	Spalek, OVP; EC; OVP; CPP, EP; Gumbel Papers Chicago; emigr. before 1933
40	Hamburger, Hans	1889–1956	Köln	1939 GB	Rt; HSP; EC; OVP
41	Hauser, Wilhelm	1883–1983	Freiburg	1938 GB	[Wi 1982]
42	Heilbronn, Hans	1908–1975	Göttingen	1933 GB	EC; DSB (Suppl); OVP; Biograph. Mem. FRS 22 (1976)
43	Heller, Isidor	1906–?	Vienna	Schweiz	M.H. Stone–Papers, Providence, R.I.
44	Hellinger, Ernst	1883–1950	Frankfurt	1939 US	DSB, Spalek; HSP; EC; OVP; Hellinger Pap. Evanst.
45	Helly, Eduard	1884–1943	Vienna	1938 US	DSB (Suppl); HSP; EC; Ist.–Mat. Issledovanija 32–33 (1990); JDMV 82 (1980); [Ein 1985]
46	Helmer–Hirschberg, Olaf	1910–?	Berlin	1936 US	OVP; [Thie 1984], later futurologist
47	Hempel, Carl G.	1905–1997	Berlin	1937 US	[Thie 1984]; later philosopher
48	Hermann, Grete	1901–1984	Göttingen	1936 GB	NJ, Rt, S. Slembeck (Talk Oberwolfach Nov. 1996)
49	Hertz, Paul	1881–1940	Göttingen	1938 US	[Thie 1984]; HSP
50	Herzberger, Max	1899–1982	Jena	1935 US	The Annual Obituary 1982, 174–176
51	Herzog, Fritz	1902–?	Berlin	1933 US	NIBD, Microfilm, PF, [Dre 1942]
52	Hirsch, Kurt	1906–1986	Berlin	1934 GB	[Hir 1986], [Gru 1988]
53	Hirschfeld, Kurt (since 1938 Hartley)	1912–1980	Berlin	1935 GB	[Dav 1982]
54	Hopf, Ludwig	1884–1939	Aachen	1939 Ireland	Jahrbuch TH Aachen 1952/53; HSP
55	Jacobsthal, Ernst	1882–1965	Berlin	1934 Norway/ (Sweden)	[Lo 1992], [Kno 1998]; HSP; OVP; [Sel 1965]
56	Jacobsthal, Walther (Bruns)	1876–?	Berlin	1939 US	OVP; [Dre 1942, 423], [Toe 1991, 177], teacher
57	Jacoby, Walter	?	Berlin	1939 US	[Dre 1942; 424], teacher
58	John, Fritz	1910–1994	Göttingen	1935 US	CPP; EC; OVP; Notices AMS 42 (1995)
59	Kármán, Theodor	1881–1963	Aachen	1930/33 US	DSB, NIBD, Biogr. Mem. FRS 12 (1966)
60	Korn, Arthur	1870–1945	Berlin	1939 US	NDB; [Weih 1983], [Lit 1993]
61	Kürti, Gustav	1903–1978	Vienna	1939 US	AC, Kürti Collection Case Western Reserve University

62	Kuhn, Paul	1901–?	Prague	1939 Norway (Sweden)	NIBD, PF; OVP
63	Ledermann, Walter	1911–	Berlin	1934 GB	[Led 1983]; [Gai/Laf 1985], letters (1997/98), living in London
64	Levi, Friedrich	1888–1966	Leipzig	1936 India	Rt, CPP; EC; OVP
65	Levin, Victor	1909–1986	Berlin	1938 SU	Uspechi Mat. Nauk 25, No.1, 205–210
66	Lewy, Hans	1904–1988	Göttingen	1933 US	[Lew 1985]; CPP; EC; Notices AMS 35 (1988), 1152
67	Lichtenstein, Leon	1878–1933	Leipzig	1933 Poland	NIBD, PF
68	Löwig, Heinrich	1904–?	Prague	1939 Australia	NIBD, PF; HSP; OVP
69	Löwner, Karl	1893–1968	Prague	1939 US	DSB, JDMV 75; HSP; EC; OVP; CP (1988)
70	Lotkin, Michael (Max)	1911–?	Berlin	1937 US	HSP, [Dre 1942, 420], AMWS 14 (1979)
71	Lüneburg, Rudolf	1903–1949	Göttingen	1934 US	NJ, NIBD, CPP
72	Lukacs, Eugen	1906–1987	Vienna	1938 US	NIBD, PF, AC, OVP; Notices AMS 35 (1988), [Gan 1982]
73	Mahler, Kurt	1903–1988	Göttingen	1933 GB	OVP; Journal Australian Math. Soc. 51 (1991)
74	Mann, Heinrich	1905–	Vienna	1938 US	OVP; letter (1993)
75	Mayer, Anton	1903–1942	Vienna	1938 GB	PF
76	Menger, Karl	1902–1985	Vienna	1937 US	Spalek, Notices AMS 43 (1996); [Ein 1985]
77	Mises, Richard von	1883–1953	Berlin	1939 US	DSB, [Fra 1954], [Ber 1980], Mises Papers Harvard, Spalek, [Bier 1988]
78	Müntz, Chaim H.	1884–1936	Berlin	1933 SU	NIBD, PF; HSP; OVP
79	Nemenyi, Paul	1895–1952	Berlin	before 1941 US	Rockef., List Displ. Scholars; Microfilm; [Dre 1942, 422]
80	Neugebauer, Otto	1899–1990	Göttingen	1939 US	NJ, Spalek; EC; OVP
81	Neuhaus, Albert (1943 Newhouse)	1914–?	Hamburg	1937 US	AMWS 19 (1995/96)
82	Neumann, Bernhard	1909–	Berlin	1933 GB	letters (1993/98), OVP, CP (1988), living in Canberra, Australia
83	Neumann, Johann von	1903–1957	Berlin	1933 US	NIBD, DSB, PF, AC; OVP; [Bier 1988], [Ul 1958], [Hal 1979]
84	Noether, Emmy	1882–1935	Göttingen	1933 US	DSB, EC; OVP;[Sri/Sa 1983]
85	Noether, Fritz	1884–1941	Breslau	1934 SU	[Scha 1990]; EC; HSP; OVP; murdered by Stalinism
86	Ornstein, Wilhelm	1905–	Warschau	1939 Turkey	AMWS 19 (1995/96)
87	Peltesohn, Rose	1913–	Berlin	1938 Palest.	NIBD, PF, living in Tel Aviv
88	Pollaczek, Felix	1892–1981	Berlin	1939 France	NIBD, HSP; OVP, [Coh 1981]; [Schrei/LeGall 1993]
89	Prager, Wilhelm	1903–1980	Göttingen/ Karlsruhe	1941 US	HSP; OVP
90	Pringsheim, Alfred	1850–1941	Munich	1939 Switzerl.	DSB, PF, JDMV 56 (1953), 1–6
91	Rademacher, Hans	1892–1969	Breslau	1934 US	NJ, DSB, Acta Arithmetica 61, CIP; EC; OVP; AC, CP (1974)
92	Rado, Richard	1906–1989	Berlin	1933 GB	JDMV 93; [Rog 1991]
93	Reichenbach, Hans	1891–1953	Berlin	1938 US	DSB, AC, Spalek, [Dan 1994]

94	Reissner, Erich	1913–1996	Berlin	1936 US	letter (1994), Notices AMS 44 (1997); [Rei 1977]
95	Reissner, Hans	1874–1967	Berlin	1938 US	[Rei 1977]
96	Reschovsky, Helene	1907–?	Vienna	1938 US	NIBD, Microfilm, PF, [Dre 1942, 422].
97	Riess, Anita	?	Hamburg?	1939 US	[Dre 1942, 422], teacher
98	Rogosinski, Werner	1894–1964	Königsberg	1937 GB	OVP; Biog. Mem. FRS 11
99	Romberg, Werner	1909–?	Munich	1938 Norway/ (Sweden)	NJ, NIBD, Microfilm
100	Rosenthal, Arthur	1887–1959	Heidelberg	1940 US	EC; OVP; JDMV 63; HSP
101	Rothe, Erich	1895–1988	Breslau	1938 US	OVP; Richardson Papers Providence, R.I.; Notices AMS 35 (1988)
102	Sadowsky, Michael	1902–1967	Berlin	1931/33 US	NJ (?); SR; teaching permit revoked 1933; [Kno 1998]
103	Samelson, Hans	1916–	Breslau	1941 US	letters (1994/98); CPP, living in Stanford, US
104	Scherk, Peter	1910–1985	Göttingen	1943 Canada	OVP; Notices AMS 32 (1985); EC
105	Schiffer, M. Max	1911–1997	Berlin	1933 Palest.	[Ding 1945]; [Schi/Sa 1979]
106	Schilling, Otto	1911–1973	Marburg	1935 US	NJ, PF, AC, Schilling Papers Purdue Univ.
107	Schur, Issai	1875–1941	Berlin	1939 Palest.	DSB; EC; CP (1973); [Bra 1973]; [Led 1983]; [Bier 1988]
108	Schwerdtfeger, Hans	1902–1990	Göttingen/ Bonn	1939 Austral.	NJ; EC; OVP: letters from Mrs. Hanna Schwerdtfeger (1993/97); HSP
109	Seckel, Alfred	?	Freiburg ?	1939 US	[Dre 1942, 425], teacher
110	Siegel, Carl L.	1896–1981	Frankfurt/ Göttingen	1940 US	DSB (Suppl); NJ, Rt, Spalek; EC;CPP, OVP; Weyl Papers, CP (1966)
111	Simon, Heinz	?	Frankfurt	1940 US	[Dre 1942, 427], teacher
112	Sperling, Käte (marr. Fenchel)	1905–1983	Berlin	1933 Denm./ (Sweden)	NIBD, [Hoy 1987], [Jes 1993]
113	Steinhaus, Heinz	?	Göttingen	1933 US	List of Displaced Scholars; Rockef. List
114	Sternberg, Wolfgang	1887–1953	Breslau	1939 US	CPP; HSP; EC; OVP
115	Szasz, Otto	1884–1952	Frankfurt	1934 US	EC; Bulletin AMS 60; CP (1955)
116	Szegő, Gabriel	1895–1985	Königsberg	1934 US	Szegő Papers Stanford, EC; OVP; CP (1982)
117	Taussky, Olga	1906–1995	Göttingen	1937 GB	AC, Notices AMS 43 (1996), letter (1993)
118	Theilheimer, Feodor	1909–	Berlin	1937 US	NIBD; OVP; [Dre 1942, 421], living in Las Cruces, US
119	Thullen, Peter	1907–1996	Münster (Rom)	1935 Ecuador	NJ, NIBD, CIP, List Displ. Scholars; Notices AMS 43 (1996)
120	Tintner, Gerhard	1907–1983	Vienna	1936 US	math. economy
121	Toeplitz, Otto	1881–1940	Bonn	1939 Palest.	DSB, JDMV 66; HSP
122	Vajda, Stefan	1901–1995	Vienna	1939 GB	letter from J. Bather (1997), incl. unpubl. interview with Vajda
123	Wald, Abraham	1902–1950	Vienna	1938 US	DSB, AC, CP (1957)
124	Warschawski, Stefan	1904–1989	Göttingen	1934 US	Notices AMS 36 (1989)

125	Wasow, Wolfgang	1909–1993	Göttingen	1939 US	OVP
126	Weinstein, Alexander	1897–1979	Breslau	1941 Canada	Selected Papers (1973, ed. Diaz); HSP; EC
127	Weyl, Hermann	1885–1955	Göttingen	1933 US	NJ, PR, Rt, DSB; EC; OVP; Spalek, Weyl Papers Zürich, JDMV 88, CP (1960)
128	Winternitz, Artur	1893–1961	Prague	1939 GB	NIBD, PF, OVP
129	Zatzkis, Henry	1915–	Heidelberg	1940 US	letter (1994); is living in New Jersey (US)
130	Zorn, Max	1906–1993	Hamburg	1933 US	NJ, NIBD, PF, Notices AMS 40 (1993)

List of German–Speaking Mathematicians Murded or Driven into Suicide by the Nazis

No.	Name	Dates	Last place of occupation, 1933/38/39	Remarks, selected sources
1	Berwald, Ludwig	1883–1942	Prague, 1939	NDB, murdered
2	Blumenthal, Otto	1876–1944	Aachen, 1933	NDB; CPP; OVP; HSP; 1939 emigr. to Netherlands, [Scha 1990], murdered
3	Eckart, Ludwig	1890–1938	Vienna, 1938	NJ; [Ein 1985]; suicide
4	Epstein, Paul	1871–1939	Frankfurt, 1933	[Scha 1990], suicide
5	Fröhlich, Walter	1902–1942	Prag, 1939	OVP; HSP; [Pi/Di 1974/76] murdered
6	Grelling, Kurt	1886–1942	Berlin, 1933	[Peck 1994], 1939 emigration to Belgium, murdered
7	Haenzel, Gerhard	1903–1944	Karlsruhe, 1933	NJ; NDB; PF; suicide
8	Hartogs, Fritz	1874–1943	Munich, 1933	PF; Suicide
9	Hausdorff, Felix	1868–1942	Bonn, 1933	DSB; NDB; HSP; OVP; suicide
10	Kahn, Margarete	1880–1942	Berlin, 1933	[Tob 1997, 50]; teacher.; murdered
11	Neumann, Nelli (first wife Courant)	1886–1942	Essen, 1933	[Tob 1997; 50], murdered
12	Pick, Georg	1859–1942	Prague, 1939	[Pi/Di 1974/76]; murdered
13	Remak, Robert	1888–1942	Berlin, 1933	OVP; HSP; [Bier 1988]; [Ding 1945]; [Mer 1992]; 1939 Emigr. to Netherlands; murdered
14	Tauber, Alfred	1866–1942	Vienna, 1938	DSB;[Ein 1985], murdered

Printed Sources

[Al/Al/Re 1990] Albers, D.J., G.L. Alexanderson and C. Reid (eds.): More Mathematical People; Boston: Harcourt Brace Jovanovich 1990

[AC] American Council for Emigrés in the Professions. Records 1941–1974, 2 volumes, mimeographed, 778 pp.

[Am 1971] Amery, J.: Unmeisterliche Wanderjahre; Stuttgart 1971.

[Ans 1951] Ansprachen anläßlich der Feier des 75. Geburtstages von Erhard Schmidt durch seine Fachgenossen (January 13, 1951), mimeographed, Berlin, 34 pp.

[Arch 1938] Archibald, R.C. (ed.): A Semicentennial History of the American Mathematical Society 1888-1938; 2 volumes, New York: AMS 1938.

[Beg 1998] Begehr, H. (ed.): Mathematik in Berlin: Geschichte und Dokumentation; Aachen: Shaker 1998.

[Beh 1962] Behrend, F.A.: Ulysses' Father; Melbourne, Canberry, Sydney: Chesire 1962

[Ber 1980] Bernhardt, H.: Zur Institutionalisierung der angewandten Mathematik an der Berliner Universität 1920–1933; *NTM–Schriftenreihe* **17** (1980), No.1, 23–31.

[Bieb 1934] Bieberbach, L.: Persönlichkeitsstruktur und mathematisches Schaffen; *Unterrichtsblätter für Mathematik und Naturwissenschaften* **40** (1934), 236–243.

[Bier 1987] Biermann, K.-R.: Für die „Fermat–Klinik" eine Leibniz–Medaille; *Spectrum* **18** (1987), No.3, 26.

[Bier 1988] Biermann, K.-R.: Die Mathematik und ihre Dozenten an der Berliner Universität 1810–1933; Berlin: Akademieverlag 1988.

[Bin 1992] Binder, Ch.: Hilda Geiringer: ihre ersten Jahre in Amerika. in: [Dem 1992; 25–53].

[Bra 1973] Brauer, A.: Gedenkrede auf Issai Schur; in: [Schu1973, V–XIII].

[Cha/Mag 1982] Chandler, B. and W. Magnus: The History of Combinatorial Group Theory: A Case Study in the History of Ideas; New York etc.: Springer 1982.

[Che/Neu 1964] Cherry, T.M. and B.H. Neumann: Felix Adalbert Behrend; *Journal Australian Mathematical Society* **4** (1964), 264–270.

[Coh 1981] Cohen, J.W.: Obituary: Felix Pollaczek; *Journal of Applied Probability* **18** (1981), 958–963 (photo)

[Cohn 1991] Cohn, H. (ed.): Doeblin and Probability; *Contemporary Mathematics* **149** (1991), Providence: AMS.

[Cost 1971] Costigan, D.M.: Fax: The Principles and Practice of Facsimile Communications; Philadelphia etc.: Chilton 1971.

[Dä/Nie 1993] Dähnhardt, W. and B.S.Nielsen (eds.): Exil in Dänemark. Deutschsprachige Wissenschaftler, Künstler und Schriftsteller im dänischen Exil nach 1933; Heide: Westholsteinische Verlagsanstalt 1993.

[Dan 1994] Danneberg, L., Kamlah, A. and L. Schäfer (eds.): Hans Reichenbach und die Berliner Gruppe; Braunschweig/Wiesbaden: Vieweg 1994.

[Dav 1982] David, H.A.: Obituary Notice. H.O. Hartley, 1912–1980; *International Statistical Review* **50** (1982), 327–330.

[Dem 1992] Demidov, S., Folkerts, M., Rowe, D. and Ch. Scriba (eds.): Amphora. Festschrift für Hans Wussing zu seinem 65. Geburtstag; Basel: Birkhäuser 1992.

[Ding 1945] Dinghas, A.: Erinnerungen aus den letzten Jahren des Mathematischen Instituts der Universität Berlin (1945); to appear in: [Beg 1998].

[Dre 1942] Dresden, A.: The Migration of Mathematicians; *American Mathematical Monthly* **49** (1942), 415–429.

[DSB] Dictionary of Scientific Biography; New York: Scribners 1970–1976 (14 volumes) + Supplement.

[Dug 1943] Duggan, S.: A Professor At Large; New York: MacMillan 1943.

[Dug/Dru 1948] Duggan, S. and B. Drury: The Rescue of Science and Learning. The Story of the Emergency Committee in Aid of Displaced Foreign Scholars; New York: Macmillan 1948.

[Dur 1988/89] Duren, P. (ed.): A Century of Mathematics, 3 vol. Providence 1988/89.

[Ein 1985] Einhorn, R.: Vertreter der Mathematik und Geometrie an den Wiener Hochschulen 1900–1940; Technische Universität Wien 1985.

[Fe 1980] Fenchel, W.: Erinnerungen aus der Studienzeit; *Jahrbuch Überblicke Mathematik* **13** (1980), 155–166.

[Fi 1990]   Fischer, G., F. Hirzebruch, W. Scharlau and W. Toernig (eds.): Ein Jahrhundert Mathematik 1890–1990. Festschrift zum Jubilaeum der DMV; Braunschweig: Vieweg 1990.

[Fra 1954]   Frank, Ph.: The Work of Richard von Mises: 1883–1953; *Science* **119** (1954), 823–824.

[Fru 1982]   Frucht, R.: How I became interested in Graphs and Groups; *Journal of Graph Theory* **6** (1982), 101–104.

[Gä 1993]   Gähler, S. and W. Gähler: Nachruf auf Josef Naas; *Mathematische Nachrichten* **161** (1993), 4–5 (photo).

[Gai/Laf 1985] Gaines, F.J. and Th.J. Laffey: The Mathematical Work of Walter Ledermann; in: *Linear Algebra and Its Applications* **69** (1985), 1–8 (photo).

[Gan 1982]   Gani, J. (ed.): The Making of Statisticians; New York/ Heidelberg/ Berlin: Springer 1982.

[Gei 1965]   Geiringer, H.: Reconsideration of v.Mises' Frequency Theory of Probability; *Journal D'Analyse Mathématique* **14** (1965), 183–198.

[Gol 1972]   Goldstine, H.H.: The Computer from Pascal to von Neumann; Princeton: Princeton University Press 1972.

[Gri/Cam 1987] Grinstein, L.S. and P.J. Campbell (eds.): Women of Mathematics. A Biobliographic Sourcebook; New York etc.: Greenwood Press 1987.

[Gru 1988]   Gruenberg, K.W.: Obituary: Kurt August Hirsch; *Bulletin London Mathematical Society* **20** (1988), 350–358 (photo).

[Ha/Sta 1993] Haller, R. and F. Stadler (eds.): Wien — Berlin — Prag. Der Aufstieg der wissenschaftlichen Philosophie; Wien: Hölder–Pichler–Tempsky 1993.

[Hal 1979]   Halmos, P.R.: The Legend of John von Neumann; *American Mathematical Monthly* **80** (1979), 382–394.

[Han 1952]   Hannak, J.: Emanuel Lasker. Biographie eines Schachweltmeisters; Berlin: Siegfried Engelhardt 1952 (with photos and cartoons of Lasker).

[Har 1964]   Harnack, A. von: Mein Abiturientenexamen; *Neue Sammlung. Göttinger Blätter für Kultur und Erziehung* **4** (1964), 469–473.

[Hir 1986]   Hirsch, K.: Sixty Years of Mathematics; *Mathematical Medley* **14** (1986), Singapore Mathematical Society, 35–50.

[Hoef 1982]   Hoeffding, W.: A Statistician's Progress from Berlin to Chapel Hill; in: [Gan 1982; 99–109].

[Hoff 1993]   Hoffmann, D.: Die Berliner „Gesellschaft für empirische/wissenschaftliche Philosophie"; in: [Ha/Sta 1993, 386–401].

[Hoy 1987]   Hoyrup, E.: Käte Fenchel (1905–1983); in: [Gri/Cam 1987, 30–32].

[IBD]   Strauss, H. and W. Röder (eds.): International Biographical Dictionary of Central European Emigrés 1933–1945. Volume II. The Arts, Sciences, and Literature; München usw.: Sauer 1983.

[Jes 1993]   Jessen, B: Mathematiker unter den deutschsprachigen Emigranten, in: [Dä/Nie 1993, 127–133] (photos H. Busemann, W. Fenchel, K. Sperling).

[Kno 1998]   Knobloch, E.: Mathematik an der Technischen Hochschule und der Technischen Universität Berlin 1770–1988; Berlin: Dr. Michael–Engel–Verlag 1998.

[Lau 1997]   Lausch, H.: Felix Adalbert Behrend and Mathematics in Camp 7, Hay, 1940–41; *Australian Jewish Historical Society Journal* **14** (1997), Part I, 110–119.

[Led 1983]   Ledermann, W.: Issai Schur and his School in Berlin; *Bulletin London Mathematical Society* **15** (1983), 97–106 (photos G. Frobenius, I. Schur, R. Brauer, A. Brauer, H. Rohrbach, R. Rado, B. Neumann, H. Caemmerer–Neumann, W. Ledermann, H. Wielandt)

[Lew 1985]   Lewy, H.: Interview; in: [Al/Al/Re 1990, 181–194].

[Lit 1993]   Litten, F.: „Vielleicht hilft uns Professor Röntgen mit der Zeit". Die Korn–Röntgen–Affäre; *Kultur & Technik* **17** (1993), No.4, 43–49.

[Lo 1992]   Lorenz, E.: Exil in Norwegen. Lebensbedingungen und Arbeit deutschsprachiger Flüchtlinge 1933–1943, Baden–Baden: Nomos 1992.

[MaPl 1998]   Max Planck. Vorträge und Ausstellung zum 50. Todesjahr. Herausgegeben von der Max Planck Gesellschaft, 1998.

[Meh 1986]   Mehrtens, H.: Angewandte Mathematik und Anwendungen der Mathematik im nationalsozialistischen Deutschland; *Geschichte und Gesellschaft* **12** (1986), 317–347.

[Meh 1987] Mehrtens, H. 1987: Ludwig Bieber-bach and 'Deutsche Mathematik'. In: Phillips, E.R. (ed.): Studies in the History of Mathematics. Washington: The Mathematical Association of America, 195–241.

[Meh 1989] Mehrtens, H.: The Gleichschaltung of Mathematical Societies in Nazi Germany; *The Mathematical Intelligencer* **11** (1989), No.3, 48–60.

[Mer 1992] Merzbach, U.: Robert Remak and the estimation of units and regulators; in: [Dem 1992, 481–522].

[Mis 1921] Mises, R. von: Über die Aufgaben und Ziele der angewandten Mathematik; *Zeitschrift für Angewandte Mathematik und Mechanik* **1** (1921), 1–15.

[Mis 1930] Mises, R. von: Über das naturwissenschaftliche Weltbild der Gegenwart; *Die Naturwissenschaften* **18** (1930), 885–893.

[Mis 1934] Mises, R. von (ed.): R.M. Rilke. Bücher–Theater–Kunst; Wien 1934.

[Mis 1935] Mises, R. von: Bericht von einer Rilke–Sammlung; *Philobiblium* **8** (1935), No.10, 4561–480.

[Mis 1947] Mises, R. von: Rilke in English. A Tentative Bibliography, Cambridge (Mass.) 1947.

[NDB] Neue Deutsche Biographie (with biographies of the mathematicians R. Fuchs, W. Dubislav, E. Jacobsthal, A. Korn, E. Lasker, R. von Mises)

[New/Wa 1974] Newman, M.F. and G.E. Wall: Hanna Neumann; Journal Australian Mathematical Society **17** (1974), 1-28

[Ost 1966] Ostrowski, A.: Zur Entwicklung der numerischen Analysis; *Jahresbericht der Deutschen Mathematikervereinigung* **68** (1966), 97–111.

[Peck 1994] Peckhaus, V.: Von Nelson zu Reichenbach: Kurt Grelling in Göttingen und Berlin; in: [Dan 1994, 53–86].

[Pie 1992] Pietzsch, G.: Prof.Dr. Lilly Görke; *Mathematik in der Schule* **30** (1992), No.9, 501.

[Pin 1969] Pinl, M.: Kollegen in einer dunklen Zeit; Teil I: *Jahresbericht DMV* **71** (1969), 167–228.

[Pi/Di 1974/76] Pinl, M. and A. Dick: Kollegen in einer dunklen Zeit. Schluß: *JDMV* **75**

(1974), 166–208, Nachtrag und Berichtigung: *Jahresbericht DMV* **77** (1976), 161–164.

[Pi/Fu 1973] Pinl, M. and L. Furtmüller: Mathematicians under Hitler; *Yearbook Leo Baeck Institute* **18** (1973), 129–182. (Also quoted as PF.)

[Pól 1987] Pólya, G.: The Pólya Picture Album. Encounters of a Mathematician; Boston/Basel: Birkhäuser 1987.

[Rei 1977] Reissner, E.: Hans Reissner, Engineer, Physicist and Engineering Scientist; *The Engineering Science Perspective* **2** (1977), No.4, 97–105.

[Reid 1976] Reid, Constance: Courant in Göttingen and New York. The Story of an Improbable Mathematician; New York etc.: Springer 1976.

[Rem 1929] Remak, R.: Kann die Volkswirtschaftslehre eine exakte Wissenschaft werden? *Jahrbücher für Nationalökonomie und Statistik* **131** (1929), 703–735.

[Rich 1987] Richards, J.L.: Geiringer, in: [Gri/Ca 1987, 41–46].

[Rid 1984] Rider, R.: Alarm and opportunity: Emigration of mathematicians and physicists to Britain and the United States, 1933–1945; *Historical Studies in the Physical Sciences* **15** (1984), 107–176.

[Rog 1991] Rogers, C.A.: Richard Rado; *Biographical Memoirs of Fellows of the Royal Society of London* **37** (1991), 413–426 (photo).

[Roh 1929] Rohrbach, H.: Die mathematisch–physikalische Arbeitsgemeinschaft (Mapha); to appear in: [Beg 1998] (reproduction of a manuscript from 1929).

[Roh 1988] Rohrbach, H.: Alfred Brauer zum Gedächtnis; *Jahresbericht DMV* **90** (1988), 145–154.

[Rot 1921] Rothe, R.: Aufgaben der Technischen Hochschule auf dem Gebiete der Geisteskultur; *Die Technische Hochschule* (Berlin–Charlottenburg) **3** (1921), 226–236.

[Rot 1934] Rothe, R.: D.F. Seliwanoff (1855–1932); *Jahresbericht DMV* **44** (1934), 210–212.

[Rür 1979] Rürup, R. (ed.): Wissenschaft und Gesellschaft. Beiträge zur Geschichte der Technischen Universität Berlin 1879–1979, 2 volumes, Berlin: Springer 1979.

[Scha 1990] Schappacher, N., unter Mitwirkung von M. Kneser (1990): Fachverband — Institut — Staat; in: [Fi 1990, 1–82].

[Schi 1981] Schiffer, M.M.: Stefan Bergman (1895–1977) in memoriam; *Annales Polonici Mathematici* **39** (1981), 5–9.

[Schi 1986] Schiffer, M.M.: Issai Schur. Some Personal Reminiscences (1986); to appear in: [Beg 1998].

[Schi/Sa 1979] Schiffer, M. and H. Samelson: Dedicated to the Memory of Stefan Bergman; *Applicable Analysis* **8** (1979), 195–199.

[Scho 1988] Schottländer, R.: Verfolgte Berliner Wissenschaft. Ein Gedenkwerk; Berlin: Hentrich 1988.

[Schrei/LeGall 1993] Schreiber, F. and P. Le Gall: In Memoriam Félix Pollaczek (1892–1981); *Archiv für Elektrotechnik und Übertragungstechnik* **47** (1993), 275–281 (photo).

[Smith 1981] Smith, W.B.: Herman Otto Hartley (1912-1980), *The American Statistician* **35** (1981), No.3, 142-143.

[Schu 1973] Schur, I.: Gesammelte Abhandlungen, Band I, herausgegeben von Alfred Brauer and Hans Rohrbach; Berlin: Springer 1973.

[Sel 1965] Selberg, S.: Jacobsthal; *Det Kongelige Norske Videnskabers Selskabs Forhandlinger* (Trondheim) **38** (1965), No.16, 70–73 (photo).

[Sie 1984] Siegmund–Schultze, R.: Theodor Vahlen — zum Schuldanteil eines deutschen Mathematikers am faschistischen Mißbrauch der Wissenschaft; *NTM* **21** (1984), No.1, 17–32.

[Sie 1987] Siegmund–Schultze, R.: Berliner Mathematik zur Zeit des Faschismus; *Mitteilungen Mathematische Gesellschaft DDR* 1987, No.4, 61–84.

[Sie 1989] Siegmund–Schultze, R.: Zur Sozialgeschichte der Mathematik an der Berliner Universität im Faschismus; *NTM* **26** (1989), No.1, 49–68.

[Sie 1993a] Siegmund–Schultze, R.: Mathematische Berichterstattung in Hitlerdeutschland. Der Niedergang des Jahrbuchs über die Fortschritte der Mathematik (1869–1945); Göttingen, Vandenhoeck & Ruprecht 1993.

[Sie 1993b] Siegmund–Schultze, R.: Hilda Geiringer–von Mises, Charlier Series, Ideology, and the Human Side of the Emancipation of Applied Mathematics at the University of Berlin during the 1920s; *Historia Mathematica* **20** (1993), 364–381.

[Sie 1998] Siegmund–Schultze, R.: Mathematiker auf der Flucht vor Hitler. Quellen und Studien zur Emigration einer Wissenschaft; Braunschweig/Wiesbaden: Vieweg 1998

[Spalek] Spalek, J.M.: Guide to the Archival Materials of the German–speaking Emigration to the United States after 1933; Charlottesville: University Press of Virginia 1978.

[Sri/Sa 1983] Srinivasan, B. and J.D. Sally (eds.): Emmy Noether Bryn Mawr; New York etc.: Springer 1983

[St/Bu/Dü 1987] Strauss, H., T. Buddensieg, K. Düwell (eds.): Emigration. Deutsche Wissenschaft nach 1933. Entlassung und Vertreibung; Berlin: Technische Universität, 1987.

[Stü 1997] Stürzbecher, M.: Dr.med Albert Fleck und die Suche nach seiner Fermat–Klinik; *Acta Historica Leopoldina* **27** (1997), 339–346.

[Su 1935] Supf, P.: Das Buch der deutschen Fluggeschichte, Band 2, Berlin: H. Klemm 1935.

[Thie 1975] Thiel, Ch.: Leben und Werk Leopold Löwenheims (1878–1957); *Jahresbericht DMV* **77** (1975), 1–9.

[Thie 1984] Thiel, Ch.: Folgen der Emigration deutscher und österreichischer Wissenschaftstheoretiker und Logiker zwischen 1933 und 1945; *Berichte zur Wissenschaftsgeschichte* **7** (1984), 227–256.

[Tob 1997] Tobies, R. (ed.): „Aller Männerkultur zum Trotz". Frauen in Mathematik und Naturwissenschaften; Frankfurt: Campus 1997.

[Toe 1991] Toepell, M. (ed.): Mitgliedergesamtverzeichnis der Deutschen Mathematikervereinigung 1890–1990; München: Institut für Geschichte der Naturwissenschaften 1991.

[Ul 1958] Ulam, S. (ed.): *John von Neumann, 1903–57, Bulletin of the American Mathematical Society* **64** (1958), 1–49, special issue, May 1958, pp.1–129, devoted to von Neumann

[Ul 1976] Ulam, S.: Adventures of a Mathematician; New York: Scribners 1976.

[Weih 1983] Weiher, S. von (1983): Männer der
Funktechnik; Berlin: VDE–Verlag.

[Weis 1985] Weissinger, J.: Erinnerungen an meine
Zeit in der DVL 1937–1945; *Jahrbuch*

Überblicke Mathematik **18** (1985), 105–
129.

[Wi 1982] Wirth, G.: Die Hauser-Chronik; Berlin:
Der Morgen 1982

Unprinted Sources, Archivals, Letters

BBAW	Berlin–Brandenburgische Akademie der Wissenschaften, Archives, Berlin
Bieberbach Papers	Papers of Ludwig Bieberbach, in the possession of Ulrich Bieberbach, Oberaudorf, Germany
BUA	Brown University Archives, Providence, Rhode Island, USA here: Applied Mathematics Division II, 154 (H. Wriston),
BPK	Bildarchiv Preussischer Kulturbesitz Berlin
Freudenthal Papers	Papers of Hans Freudenthal, Amsterdam. Quoted from copies in ETH Zürich, Hs 1183
Freudenthal Papers 1	ETH Zürich, Hs 1183:54
Freudenthal Papers 2	ETH Zürich, Hs 1183:76
GSA	Geheimes Staatsarchiv Preußischer Kulturbesitz, Berlin
GSA 1	GSA, Rep. 76Va, Sekt. 2, Tit. IV, No.68c, fol.349
GSA 2	GSA, Rep. 76Vb, Sekt. 5, Tit. III, No.1, vol.2, fol.172., fol.180 (incl. back)
Heinz–Hopf–Papers	ETH Zürich, Hs.621, here: fol.306c, letter Hopf to R. Brauer, November 21, 1938
Kármán Papers	Papers of Theodor Kármán, Archives California Institute of Technology, Pasadena, California, USA
Landé Papers	Papers of Alfred Landé, Staatsbibliothek Preußischer Kulturbesitz Berlin, here: No.64, fol.5, H. Reichenbach to Landé, December 27, 1934
LD Erlangen	Logikdokumentation des Instituts für Philosophie der Universität Erlangen–Nürnberg
Letters	... to R. Siegmund–Schultze
letter 1	Walter Ledermann, December 11, 1997
letter 2	Rachel Theilheimer (for her father Feodor Th.), December 17, 1997
letter 3	Barbara Jaeckel (for her father Richard Fuchs), February 13, 1998
letter 4	Sabine Hank (Centrum Judaicum Berlin), May 6, 1998
letter 5	Helmut Wielandt, November 9, 1989
letter 6	Eric Reissner, March 18, 1994
letter 7	Bernhard H. Neumann, August 22, 1993
Microfilm	Microfilm to International Biographical Dictionary Strauss/Röder 1983 [IBD]
Mises Papers	Papers of Richard von Mises, Harvard University Archives, Cambridge, Mass., USA
Mises Papers 1	Mises Papers, 4574.5, correspondence, box 2, folder 1933
Mises Papers 2	Mises Papers, 4574.5, correspondence, box 3, folder 1939
Mises Papers 3	Mises Papers, 4574.5, correspondence, box 2, folder 1935, H. Rohrbach to von Mises, January 1, 1935
Schröder Papers	Papers of Kurt Schröder, BBAW, here: No.508, R. von Mises to President J. Stroux, September 15, 1950
Shapley Papers	Papers of Harlow Shapley, Harvard University Archives, Cambridge, Mass., USA; here: Box 6B, file L (1937)
Thomas–Mann–Archiv	ETH Zürich, here: report by Felix A. Behrend: „Die Fahrt zu den Vätern" (1961), 19 pages, typoscript
UAB	University Archives Berlin, Humboldt Universität
UAB 1	UAB, NS–Dozentenschaft, No.222 (E. Schmidt), fol.9
UAB 2	UAB, personal file Richard von Mises, UK M 220
van der Waerden Papers	Papers of B.L. van der Waerden, ETH Zürich, Hs. 652, here: fol.11988c
Veblen Papers	Papers of Oswald Veblen, Library of Congress, Washington, D.C., USA
Veblen Papers 1	Veblen Papers, cont.15, folder: J. v. Neumann (1929–1956)
Veblen Papers 2	Veblen Papers, cont.32, folder: R. Remak
Weyl Papers	Papers of Hermann Weyl, ETH Zürich, Hs. 91, here: fol.19a, Weyl to P. Bernays, March 25, 1940 (courtesy L. Beaulieu, Montreal)

Sources of Pictures

Page   Picture: Source

5   **Civil Service Law and Executory Order:** Reichsgesetzblatt I 1933, pp.175/76 and 195
6   **The burning of books:** BPK
6   **Demonstration in front of the University:** BPK
6   **Boycott–posts:** BPK
7   **Sadowsky's teaching permission revoked:** GSA 2, fol.180 (incl. back)
8   **Theodor Vahlen:** *Deutsche Mathematik* **4** (1939), p.277
9   **Ludwig Bieberbach:** private possession Ulrich Bieberbach (Oberaudorf)
9   **Georg Hamel:** private possession Eberhard Knobloch (Berlin)
10 **Joint paper Bieberbach/Schur:** Sitzungsberichte Preußische Akademie der Wissenschaften 1928
11 **Erhard Schmidt:** Porträt- und Fotosammlung Humboldt–Universität Berlin
11 **Rudolf Rothe:** private possession Eberhard Knobloch (Berlin)
12 **Brunsviga calculator:** F.A. Willers: Methoden der praktischen Analysis, Berlin: de Gruyter 1950, p.39.
13 **Richard von Mises:** private possession Magda Tisza (Boston)
13 **Catalog of v. Mises' Rilke–Collection:** Rilke–Catalog, edited by Paul Obermueller, Insel-Verlag, Frankfurt 1961, title
13 **Rainer Maria Rilke:** Rilke-Catalog, edited by Paul Obermueller, Insel-Verlag, Frankfurt 1961, opposite to title
15 **Letter R. v. Mises (Tollmien):** Kármán Papers Pasadena 20.37
16 **Letter Hilda von Mises:** private possession Ulrich Bieberbach (Oberaudorf)
16 **Stefan Bergman:** [Schi 1981], title
18 **Hilda Geiringer:** private possession Magda Tisza (Boston)
19 **Letter Reissner:** private possession
20 **Obituary for Jacobsthal**
21 **E. Jacobsthal and others:** [Pól 1987, p.44]
21 **John von Neumann:** from: J. von Neumann, Collected Works, vol. 1. Oxford etc., Pergamon Press, p. iii.
22 **IAS computer:** [Gol 1972, p.121/22]
23 **Issai Schur:** Porträtsammlung Oberwolfach
23 **List of Ph. D. students of I. Schur:** [Led 1983, p.103]
23 **Alfred Brauer:** [Led 1983, p.104/5]
24 **Käte Sperling–Fenchel:** courtesy Bernhelm Booss-Bavnbek (Copenhagen)
24 **Kurt August Hirsch 1957:** [Gru 1988, p.350/51]
24 **Walter Ledermann:** [Led 1983, p.104/5]
24 **Bernhard Neumann:** [Led 1983, p.104/5]
25 **Hanna von Caemmerer–Neumann:** [Led 1983, p.104/5]
25 **Felix Pollaczek:** private possession Magda Tisza (Boston)
25 **Richard Rado:** [Led 1983, p.104/5]
25 **Menahem Max Schiffer:** [Pól 1987, p.145]
26 **Circular Preußische Akademie der Wissenschaften:** BBAW, II–VII, 17, fol.18.
27 **Max Planck:** Archiv der Deutschen Physikalischen Gesellschaft, Bad Honnef
27 **Staatsbibliothek:** BPK
27 **Issai Schur:** [Led 1983, p.104/5]
28 **Schur's tomb:** private possession Leo Corry (Tel Aviv)
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