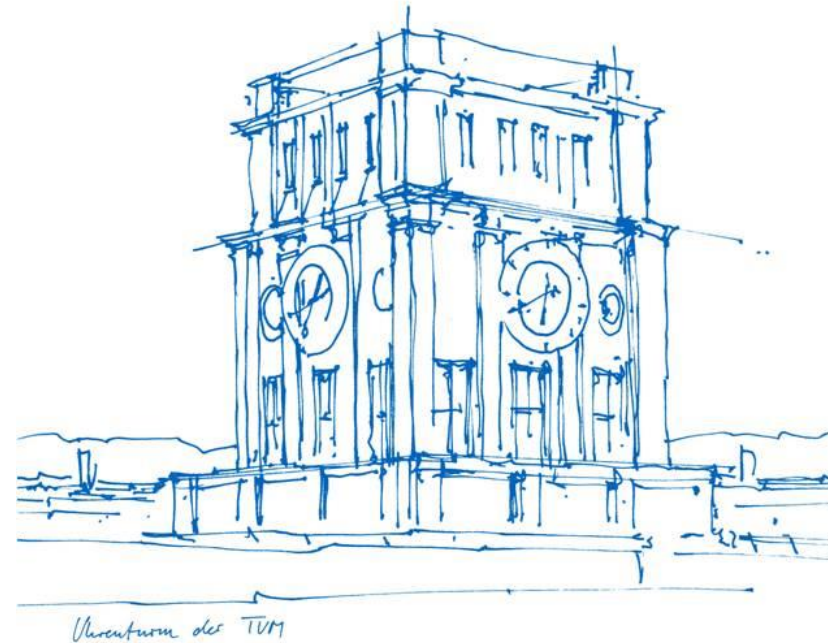


Mathematicians 1933 - 1945

- T. Huckle
- Technical University of Munich
- Department of Informatics
- Scientific Computing

Garching, 15.6.2018



Overview

- (1) Timeline Mathematics in Germany 1933-1945
- (2) Jewish Mathematicians under the Nazis
- (3) Mathematics at War

Mathematics in Germany before 1933

Göttingen as focal point of Mathematics and Physics
with Felix Klein, David Hilbert, and the Physics groups around Max Born and Ludwig Prandtl.

Development of

- the foundation of Mathematics (Hilbert Problems)
- the foundation of the General Theory of Relativity
- the foundation of Quantum Theory
- the foundation of Aerodynamics (Prandtl, Theodor von Kármán)



Wikipedia

„Hilbert’s Göttingen is still remembered as a Camelot for mathematics and physics. All roads led to Göttingen from 1900 to 1933, just as the mathematical community there had designated a point on the town square ‘the origin of the coordinates’.”

Yandell, The Honors Class

Alfred Haar

Hans Minkowski

Ernst Hellinger

David Hilbert



Mathematics in Germany before 1933

Other Centers besides Göttingen:

- Berlin (Schur, v.Neumann, Bieberbach,..)
- Bonn (Toeplitz, Hausdorff,..)
- Munich (Pringsheim)

Jewish Mathematicians were in prominent positions and played an important role in the society.

Nevertheless Jewish scientist were emigrating to US already before 1933, e.g. John von Neumann and Kármán.

1933

First steps by the Nazis:

- New Nazi law „Wiederherstellung des Berufsbeamtentum“, April 7: Dismissal of Jewish „Beamte“ (public servants) apart from persons who
 - were WWI soldiers,
 - have been employed since 1914,
 - lost a father or a son in WWI.

The new law also allowed to retire public servants prematurely.

- KZ Dachau since March 23 (on the occasion of the „Reichstagsbrand“)



Wikipedia

First group of emigrants: Richard Courant, Albert Einstein, Emmy Noether, Richard von Mises, Hermann Weyl, Hans Rademacher, Wilhelm Prager, Hilde Geiringer

1935

Aggravation of the Nazi laws: Dismissal of all „nichtarische Beamte“ (non-aryan public servants)
(Otto Toeplitz, Felix Hausdorff, Issai Schur)

Nazi student boycotts against jewish lecturers at many Universities
(e.g. Otto Teichmüller against Edmund Landau)

Nazi mathematicians took over the leadership in German Universities
(like Bieberbach, Teichmüller, Vahlen, Tornier)

Other mathematicians kept still and complied with the new rules.

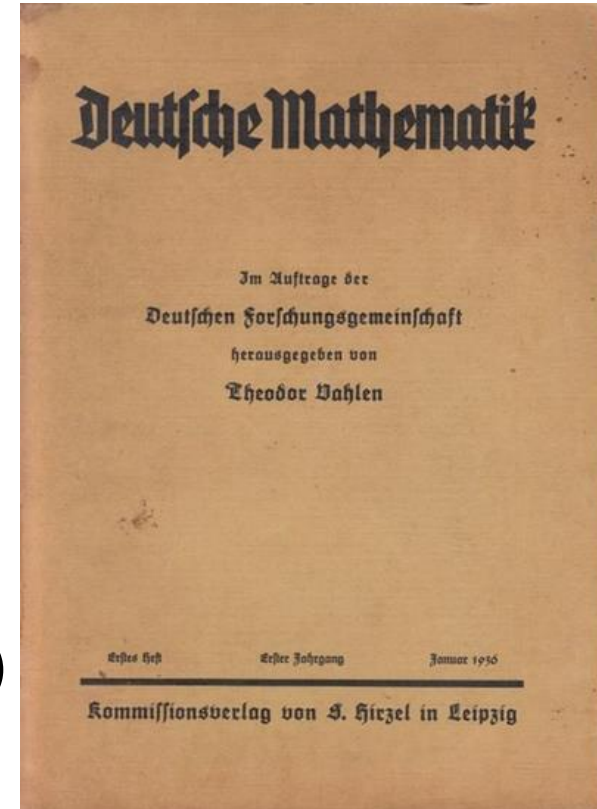
The only statement that can be considered some kind of „resistance“ was a speech of Bartel Leendert van der Waerden on the occasion of Emmy Noethers death.

Max Planck meeting Hitler.

„Deutsche Mathematik“

Journal to promote "German mathematics" and eliminate "Jewish influence" in mathematics, similar to "Deutsche Physik".

Intuitionism and Constructivism (Brouwer, Weyl) vs. Formalism and Axiomatics (Hilbert)



“Mathematics is a creation of the mind. The truth can only be conceived via a mental construction that proves it to be true, and the communication between mathematicians only serves as a means to create the same mental process in different minds”

1938

New Law for Jews: „Judenvermögensabgabe“ (property levy = confiscation)

Removal of the last Jews out of the Academy of Sciences (Pringsheim, Schur)

1939-1945

Last emigrations (Toeplitz, Schur,...)

KZ (Hellinger, Remak,...)

Suicide (Hausdorff, Epstein,...)

Richard Courant

8.1.1888 Lublinitz (near Breslau (Wroclaw)) - 27.1.1972 New Rochelle, NY

Studies in Breslau, Zürich, Göttingen.

Topics:

Analysis, Function Theory, Mathematical Physics

Books:

Courant/Hilbert: Methoden der mathematischen Physik

Emigration 1933 to England, 1934 to New York

Founder of the Courant Institute, NYU



MacTutor

Richard von Mises

19.4.1883 Lemberg (Lviv, Lvov) - 14.7.1953 Boston, MA

Studies at TU Wien, Brünn, Strassburg, Dresden, Berlin.

Topics:

Applied Mathematics: probability, statistics,
numerical solutions of differential equations,
elasticity and aerodynamics



MacTutor

Emigration November 1933 to Turkey, 1939 to Harvard

Emmy Noether

23.3.1882 Erlangen - 14.4.1935 Bryn Mawr, PA

Studies in Erlangen, Göttingen.

As a woman, she had special difficulties in attending lectures and getting University positions.

Topics:

Algebra

Book:

Modern Algebra by B.L. van der Waerden, based mainly on Noethers work

Emigration 1933 to Bryn Mawr

“You did not believe in evil, indeed it never occurred to you that it could play a role in the affairs of man..... In the midst of the terrible struggle, destruction and upheaval that was going on around us in all factions, in a sea of hate and violence, of fear and desperation and dejection - you went your own way, pondering the challenges of mathematics with the same industriousness as before. When you were not allowed to use the institute's lecture halls you gathered your students in your own home. Even those in their brown shirts were welcome; never for a second did you doubt their integrity. Without regard for your own fate, openhearted and without fear, always conciliatory, you went your own way.”

H. Weyl



MacTutor

Otto Toeplitz

1.8.1881 Breslau (Wroclaw) – 15.2.1940 Jerusalem

Studies in Breslau, Göttingen, Kiel, Bonn.

Topics:

Infinite dimensional spaces, Toeplitz Operators/Matrices, teaching Mathematics

Emigration 1939 to Palestine

Buried at Mount Olive Cemetery, Jerusalem



MacTutor

„Denn dies ist meine Auffassung: wir müssen die Stellen, auf denen man uns lässt, bis zum letzten Augenblick halten, nicht als ob eine Besserung in Sicht wäre – ausgeschlossen – sondern weil wir sonst in irgend einer Form der allgemeinen Judenheit zur Last fallen, mindestens einem anderen die Stellen wegnehmen. Ich betrachte es als ein Opfer, das ich der Judenheit bringe, auf diesem Posten auszuhalten.“

„This is my opinion: we have to hold the positions, that are allowed for us, as long as possible, not because of a possible upturn - impossible - but because we would impose on the Jewry, at least not take away positions from others. I consider it an offering to the Jewry, to stand at this position.“

Toeplitz matrix:

$$T = \begin{pmatrix} t_0 & t_1 & t_2 & \cdots & \cdots & \cdots & \cdots & \cdots & t_n \\ t_{-1} & t_0 & t_1 & t_2 & \cdot & \cdot & \cdot & \cdot & \vdots \\ t_{-2} & t_{-1} & t_0 & t_1 & \ddots & \cdot & \cdot & \cdot & \vdots \\ \vdots & t_{-2} & t_{-1} & \ddots & \ddots & \ddots & \cdot & \cdot & \vdots \\ \vdots & \cdot & \ddots & \ddots & \ddots & \ddots & \ddots & \cdot & \vdots \\ \vdots & \cdot & \cdot & \ddots & \ddots & \ddots & t_1 & t_2 & \vdots \\ \vdots & \cdot & \cdot & \cdot & \ddots & t_{-1} & t_0 & t_1 & t_2 \\ \vdots & \cdot & \cdot & \cdot & \cdot & t_{-2} & t_{-1} & t_0 & t_1 \\ t_{-n} & \cdots & \cdots & \cdots & \cdots & \cdots & t_{-2} & t_{-1} & t_0 \end{pmatrix}$$

Related to function

$$f(x) = \sum_{j=-\infty}^{\infty} t_j \exp(ijx)$$

Range of values of matrix T is related to range of values of corresponding function f

Periodic case: Circulant matrix, related to DFT.

Issai Schur

10.1.1875 Mogilev, Russia - 10.1.1941 Tel Aviv

Studies in Berlin, Bonn, Berlin

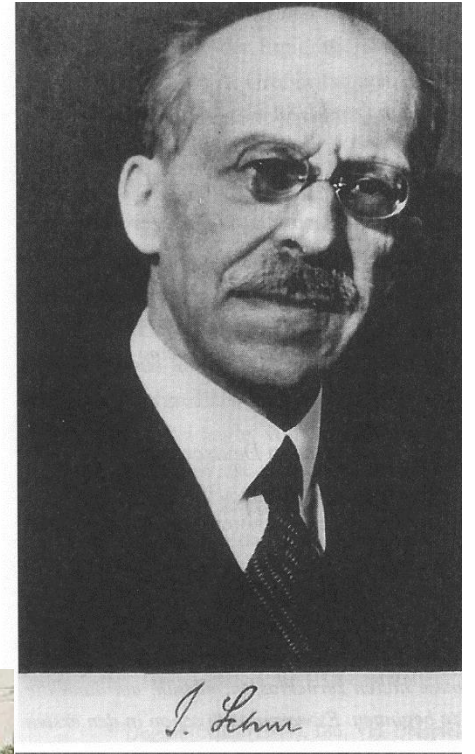
Member of the Prussian Academy of Science, Berlin

Topics:

Representation of groups, groups of matrices

Schur Complement, Schur Decomposition, Schur Normal Form

Emigration 1939 to Palestine, Trumpeldor Cemetery, Tel Aviv



MacTutor



Wikimedia

Eingegangen
1. APR. 1933
Erledigt

PREUSSISCHE AKADEMIE DER WISSENSCHAFTEN

Zirkular

betr. Weierstrass - Ausgabe

11/38 An die Mitglieder der Akademie

HH.

Schmitt gesehen 11.3.38 Ehardt

Schmitt gesehen 12/3/38 Schmitt

Bieberbach Ich wundere mich, dass Juden noch den akademischen
Kommissionen angehören.

Vahlen Ich beantrage Änderung.

Planck Ich werde die Angelegenheit erledigen.

Planck, 3.4.38 Fy wurde in Angelegenheit erledigt. Hand

Bieberbach: Ich wundere mich, dass Juden noch den akademischen
Kommissionen angehören.
Vahlen: Ich beantrage Änderung.
Planck: Ich werde die Angelegenheit erledigen.

Bieberbach Ich wundere mich, dass
Vahlen Juden auf den akademischen
Kommissionen angehören.
Planck, 3.4.38 Fy wurde in Angelegenheit erledigt. Hand

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 beigelegt.

Alfred Pringsheim

2.9.1850 Ohlau - 25.6.1941 Zürich

Studies in Berlin, Heidelberg, Munich.

Member of the Bavarian Academy of Science (expelled 1938)

Father in law of Thomas Mann

Villa in Arcisstr. 12 in Munich, now „Münchner Haus der Kulturinstitute“

Topics:

Infinitary Calculus

Emigration 1938 to Zürich



MacTutor



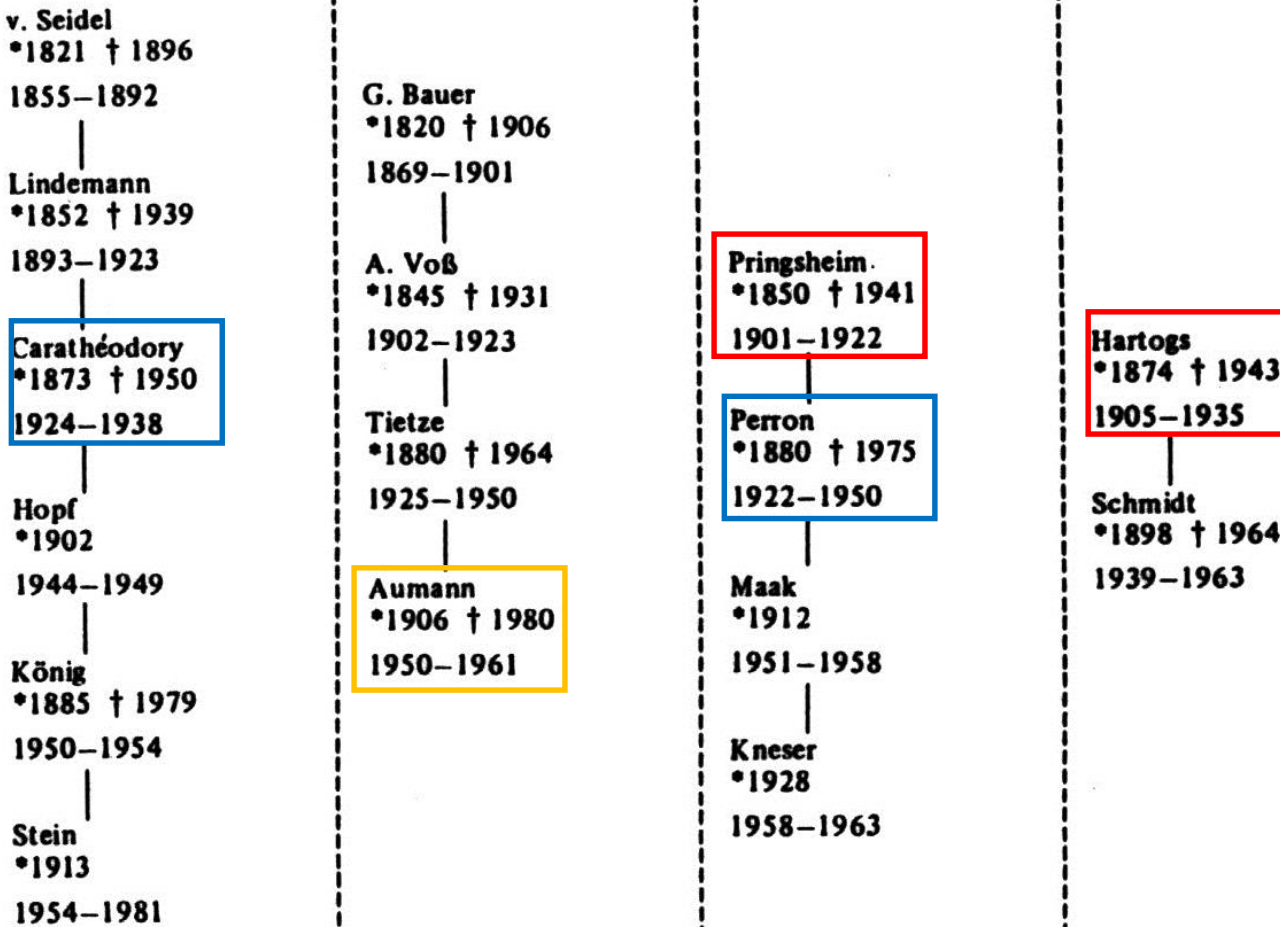
Wikipedia

Alfred Pringsheim

Villa in Arcisstr. 12 in Munich, replaced by Nazi „Verwaltungsbau“,
now „Münchner Haus der Kulturinstitute“

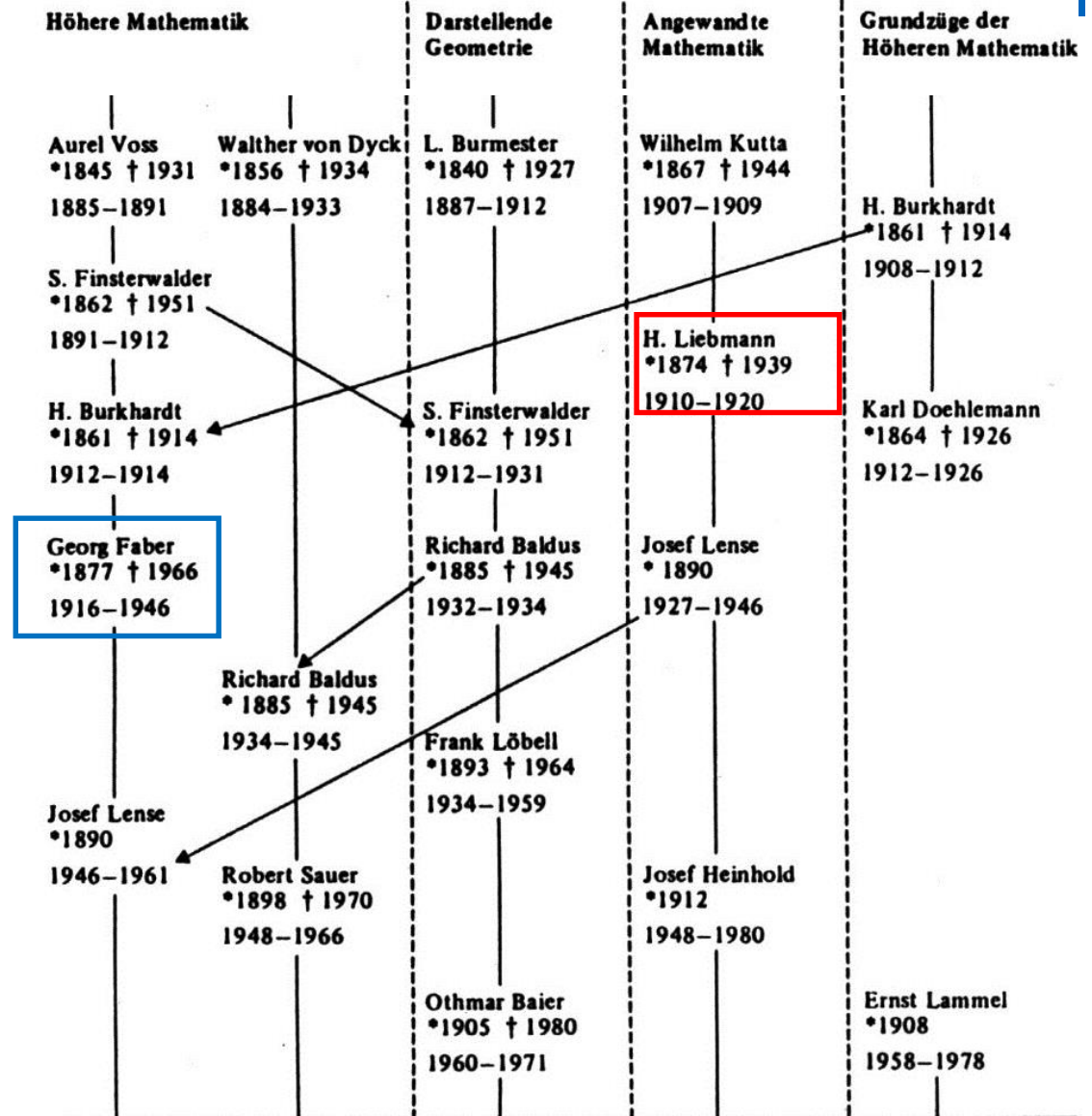


Chronik der Mathematiklehrstühle der Ludwig-Maximilians-Universität München¹



¹Mit freundlicher Hilfe des Archivs der Ludwig-Maximilians-Universität München.

Chronik der Mathematiklehrstühle der TU München¹



¹Aus einer von P. Vachenauer, Institut für Mathematik der TU München, erstellten Chronik

Kurt Freudenthal = Curt Fulton

Ph.D. 1935 at TU Munich

Emigration 1936 to Bogotá with support by C. Carathéodory

Max Demmel, (Dozentenschaftsführer) a senior official in the Group of Teachers in Munich, tried unsuccessfully to deny him the doctoral degree in 1936

In 1946 Freudenthal moved to UC Davis and changed his name to Curt Fulton

Friedrich Hartogs

20.5.1874 Brussels - 18.8.1943 Munich

Studies in Hannover, Berlin, Munich.

Topics:
Complex Analysis

Married to Aryan wife. Had to divorce to protect his wife.
Suicide by overdose of barbiturates.

Heinrich Liebmann (1874-1939) Leipzig, Jena, Göttingen, Leipzig, TU München, Heidelberg, eviction from Heidelberg. Move to TU Munich, eviction from Bayer. Akad., died 1939.



MacTutor



Ernst Hellinger

30.9.1883 Striegau - 28.3.1950 Chicago

Studies in Heidelberg, Göttingen, Marburg, Frankfurt.

Topics:

Integral Equations, Continued Fractions,

November 1938 arrested and sent to Dachau Concentration Camp.
Released after 6 weeks in view of invitation to US.

Emigration to Northwestern University, February 1939.

1949 he received an appointment at the Illinois Institute of Technology



MacTutor

Felix Hausdorff

8.11.1868 Breslau (Wroclaw) - 26.1.1942 Bonn

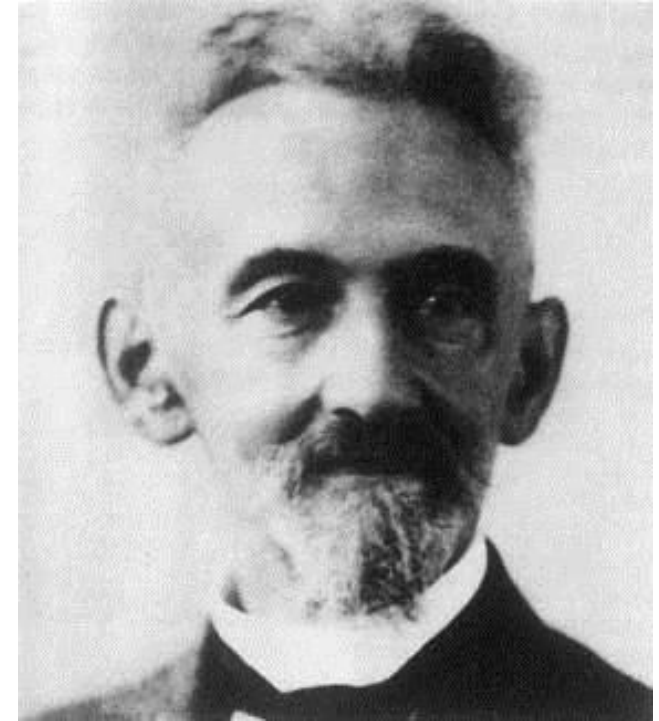
Studies in Leipzig, Bonn, Greifswald, Bonn.

Topics:

Topology, Set Theory

Writing literary books using the pen name *Paul Mongré*

Suicide with his wife 1942



MacTutor

Dear Friend Wollstein

By the time you receive these lines, we three will have solved the problem in another way - in the way which you have continually attempted to dissuade us. ...

What has been done against the Jews in recent months arouses well-founded anxiety that we will no longer be allowed to experience a bearable situation. ...

Forgive us, that we still cause you trouble beyond death; I am convinced that you will do what you are able to do (and which perhaps is not very much). Forgive us also our desertion! We wish you and all our friends will experience better times

Yours faithfully

Felix Hausdorff

F. Hausdorff, Der Wertvorrat einer Bilinearform,
Math. Z. 3 (1919), 314-316.

O. Toeplitz, Das algebraische Analogon zu einem Satz von Fejer,
Math. Z. 2 (1918), 187-197

THE TOEPLITZ-HAUSDORFF THEOREM FOR LINEAR OPERATORS

KARL GUSTAFSON¹

THEOREM (TOEPLITZ-HAUSDORFF). *The numerical range $W(A) = \{(Ax, x) : \|x\| = 1, x \in D(A)\}$ of an arbitrary (perhaps unbounded and not densely defined) linear operator A in a (pre)-Hilbert space (real or complex) is convex.*

Other topics: Hausdorff space, Hausdorff dimension

Literary work aus Paul Mongré:

- *Sant'Ilario: Thoughts from Zarathustra's Country*
- *Das Chaos in kosmischer Auslese (The chaos in cosmic selection)*
- *Ekstases (Ecstasy) (poetry)*
- *Der Arzt seiner Ehre (In honor of the doctor) (farce)*

FELIX HAUSDORFF

Gesammelte Werke

BAND VIII

Literarisches Werk

FELIX HAUSDORFF

Gesammelte Werke

BAND VII

Philosophisches
Werk

Robert Remak

14.2.1888 Berlin – 13.11.1942 Auschwitz

Studies in Berlin, Marburg, Göttingen, Freiburg, Berlin

Topics:

Algebra, Number Theory

Difficult personality, many quarrels

Arrested in Progom night („Reichskristallnacht“) and put to Sachsenhausen concentration camp.

Emigration to Netherlands. October 1942 concentration camp Westerbork.

July 1942 to Auschwitz.



MacTutor

Otto Blumenthal

20.7.1876 Frankfurt - 13.11.1944 Theresienstadt

Studies in Göttingen, Aachen.

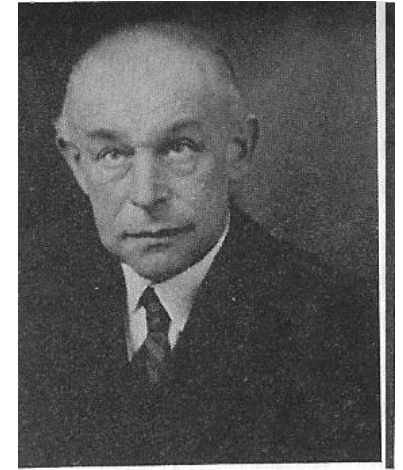
Topics:

Complex Function Theory, Applied Mathematics

Executive member of DMV

1939 emigration and position in Delft

1943 concentration camp Westerbork, 1944 to Theresienstadt



MacTutor

„Ich wage nicht, an eine dauernde Auslandsstelle zu denken: das ist ein schöner Traum. Aber vielleicht findet sich die Möglichkeit zu Vorträgen oder Semesterkursen. Kannst Du mir zu dergleichen verhelfen? SOS.“

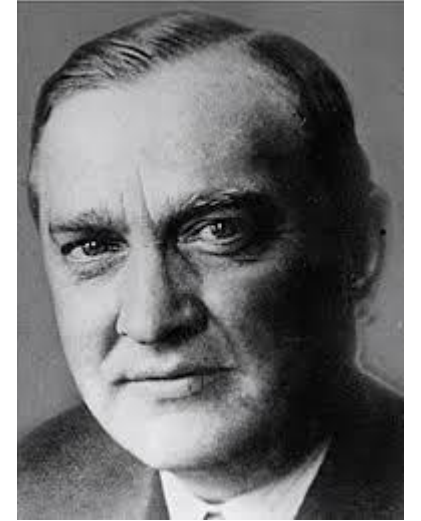
Letter to Kármán, 1933

„I do not dare to believe in a permanent position abroad: that is a lovely dream. But perhaps there exists a possibility for talks and guest lectures. Could you help me here? SOS.“

Banach

30.3.1892 Kraków - 31.8.1945 Lvov (Lviv, Lemberg)

Arrested under suspicion of trafficking in German currency but released after a few weeks.

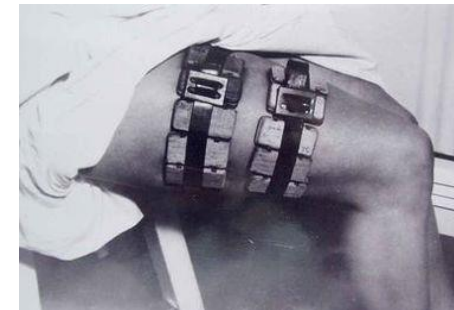


MacTutor

His doctoral supervisor Lomnicki dying on the tragic night of 3 July 1941 when many massacres occurred.

Towards the end of 1941 Banach worked feeding lice in the institute of Rudolf Weigl to produce viable typhus vaccine.

Died from lung cancer after liberation by the Russian forces



Wikipedia

Mathematics at War



Konrad Zuse (Computer)

Alwin Walther (V2)

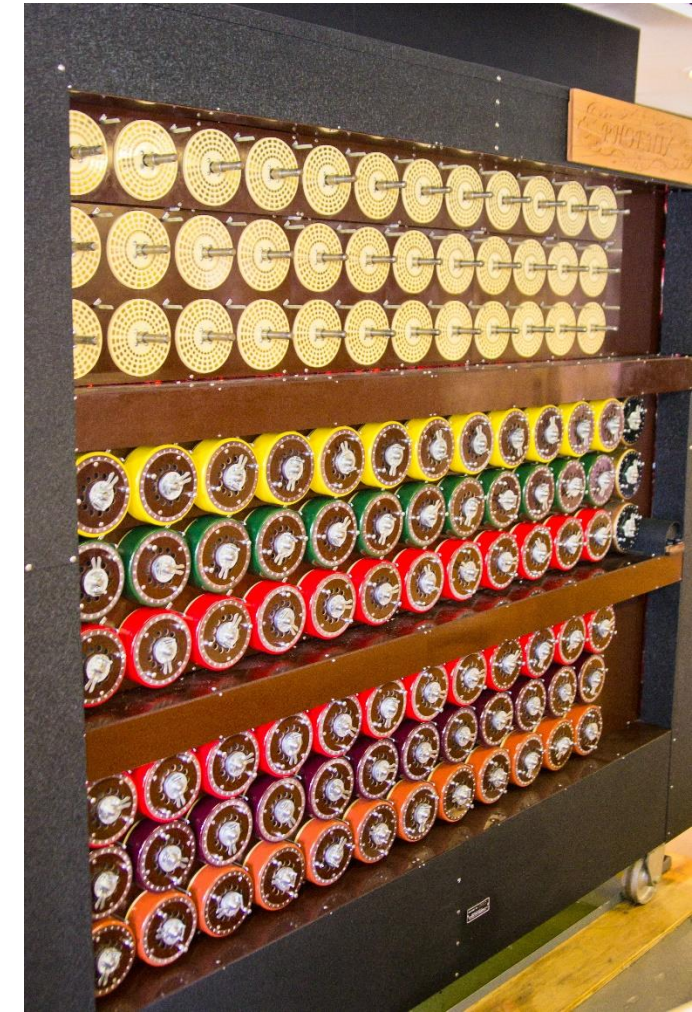
Curt Herzstark (most advances mechanical pocket calculator)

George Dantzig (Combat Analysis Branch, USAF)

John von Neumann (Manhattan project)

Frederick Lindemann, Lord Cherwell (Advisor of Churchill)

Alan Turing (Decoding, Bombe)



Werner Heisenberg

5.12.1901 Würzburg - 1.2.1976 Munich

Studies in München, Göttingen, Leipzig, München.

„Weißer Jude“ because of „non-aryan research“. Appeasement via Himmlers mother.
Could get no position in Munich because of Nazis.

Head of the German „Uranverein“.

Wrong calculation of the necessary amount of Uranium 235 to allow a chain reaction.

His student Otto Frisch (nephew of Lise Meitner) did the calculations right → Manhattan Project.

No success in constructing a nuclear bomb. Therefore, turn to develop a reactor.

Meeting with Nils Bohr in **Copenhagen**.

After WWII the German physicists were arrested and kept in Farm Hall.

Heisenberg, Otto Hahn, Carl Friedrich von Weizsäcker,...

Their conversations were tapped.

Legend of „good German physicists“ working on a reactor and not on the bomb!



Literature

Index of Biographies, MacTutor History of Mathematics, School of Mathematics and Statistics, University of St. Andrews, Schottland

Hilbert's Gift, Jean Medawar and David Pyke

Das „Dritte Reich“ in der Naturwissenschaftsgeschichte, Herbert Mertens

Kollegen in einer dunklen Zeit, Teil I-III, Jahresbericht der DMV, Maximilian Pinl, (Auguste Dick)

Mathematicians under Hitler, Maximilian Pinl and Lux Furtmüller

Fachverband – Institut – Staat, in: Ein Jahrhundert Mathematik 1890 – 1990, Norbert Schappacher and Martin Kneser

Arcisstraße 12, Alexander Krause

Literature

Mathematicians under the Nazis, Sanford Segal

Mathematiker auf der Flucht vor Hitler, Reinhard Siegmund-Schultze

The Honors Class, Benjamin Yandell

Universität unterm Hakenkreuz, Helmut Heiber

Mathematical Apocrypha: Anecdotes, Steven Krantz

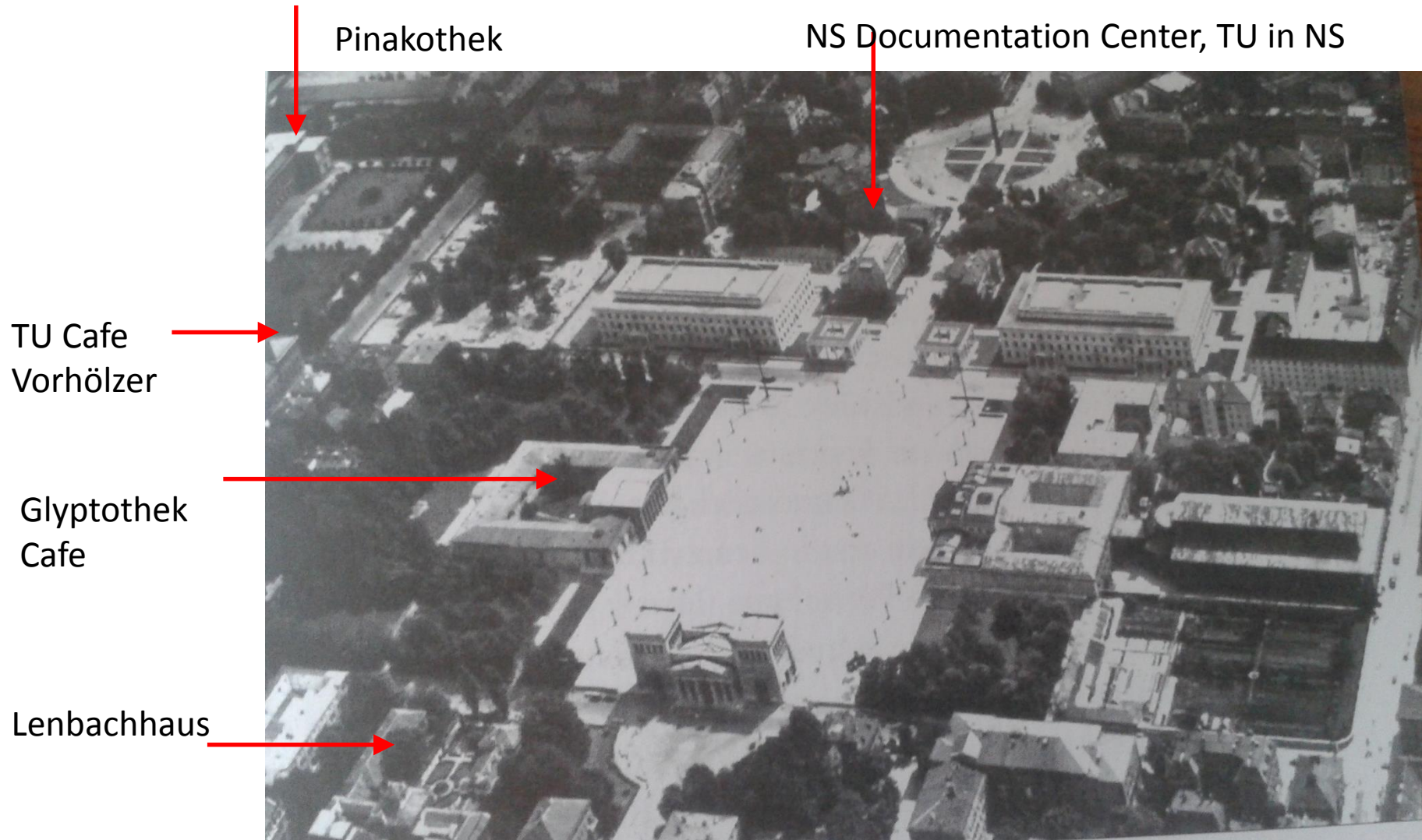
Biographisches Lexikon in Mathematik promovierter Personen, Renate Tobies

Pringsheim, Liebmann, Hartogs – Schicksale jüdischer Mathematiker in München, F.L. Bauer

Fritz Hartogs – das Schicksal eines jüdischen Mathematikers in München, F.L. Bauer

Mathematiker und Mathematik an der Universität München – 500 Jahre Lehre und Forschung, Michael Toepell

Places to visit: Königsplatz and surroundings



Deutsches Museum:
Curta and Z3/Z4

Killed

Berwald, Ludwig: Lodz April 1942.

Blumenthal, Otto: Theresienstadt 1944.

Cavaillès, Jean: Killed by the Gestapo 1944

Dickstein, Samuel: Died in nazi bombing of Warsaw 1939.

Epstein, Paul: Suicide after summon from Gestapo August 1939.

Froehlich, Walter: Lodz and died there 1942.

Friedrich Hartogs: Suicide 1943 in Munich.

Hausdorff, Felix: 1942 committed suicide.

Pick, Georg: Theresienstadt died there in July 1942.

Remak, Robert: 1942 Auschwitz where he died.

Saks, Stanislaw: 1942 killed by Gestapo in Warsaw.

Schauder, Juliusz Pawel: Killed by Gestapo 1943 in Poland.

Tauber, Alfred: Died in Theresienstadt 1942

survived

Balas, Egon: Resistance fighter in Hungary; imprisonment, torture, escape and hiding

Borel, Emile: Arrest and brief imprisonment under the Vichy regime he worked for the Resistance.

Borsuk, Karol: Imprisoned in Poland

Caccioppoli, Renato: Arrested, declared mad and sent to an asylum.

Funk, Paul: Dismissed 1939 in Prague, deported to Theresienstadt 1944, survived.

Grell, Heinrich: Arrested, kept in concentration camps for months 1939

Herzstark, Curt: Imprisoned from 1943 - 45 in KZ Buchenwald,

Kaluznin, Lev: 1941 arrested in France, 1942 to concentration camp Wahlsburg. 1945 return to Paris.

Loewenheim, Leopold: He was forced to retire in 1934 (he was a quarter non-Aryan !)

Marczewski, Edward: Near the end of the war captured, labour camp in Wroclaw.

Mohr, Ernst: Sentenced to death, but survived.

Pinl, Max: Arrest by Gestapo 1939, six months imprisonment "on remand" until 1940

Renyi, Alfred: 1944 fascist Labour Camp, escape.

Schwarz, Stefan: 1944 Sachsenhausen, buchenwald

Turan, Paul: 32 months in a nazi labour camp from 1941 to 1944 in Hungary.

Wazewski, Tadeusz: Two years in Sachsenhausen concentration camp.

Weil, Andre: He fled to Finland ,was sent back to France where he was put in prison. Out of prison to the army; escape to the US.

Zarankiewicz, Kazimierz: Teaching in the underground university. 1944 sent to a labour camp in Germany.

Zermelo, Ernst: Disciplinary proceedings in 1935 for refusal of the Hitler salute and disparaging remarks about the "Fuehrer"; he forestalled the result by resigning.

Hiding

[Freudenthal, Hans](#): Hiding during nazi occupation in Amsterdam.

[Lakatos, Imre, born as Imre Lipschitz](#):

Changed his name to Imre Molnar to avoid nazi persecution in Debrecen.

[Levy, Paul](#): Left Paris 1942, hiding in Lyon and Macon.

[Steinhaus, Hugo](#): From June 1941 hiding from the nazis in Poland.

Emigration

Artin, Emil: 1937 from Hamburg to USA

Bergman, Stefan: In 1937 forced to leave Russia.

Bernays, Paul: 1939 dismissed in Goettingen, moved to Zurich.

Bernstein, Felix: In 1934 to the USA

Born, Max: 1933 to England.

Brauer, Richard: To USA

Cohn-Vossen, Stefan: To Moscow where he died 1936.

Courant, Richard: New York

Dehn, Max Wilhelm: 1940 emmigration to USA.

Erdelyi, Arthur: Emigration 1938 from Prague

Fano, Gino: Turin by fascists 1938, to Switzerland.

Fraenkel, Adolf: Hebrew University of Jerusalem from 1929.

Frank, Philipp: 1938 fleeing to the United States.

Friedrichs, Kurt: 1937 joined Courant,

Froehlich, Albrecht: Escaped 1933 from Munich to Palestine. England.

Geiringer, Hilda: Emigration with von Mises,

Goedel, Kurt: 1940 from Vienna to USA

Gumbel, Emil: Leftist pacifist, 1932

Hadamard, Jaques: 1940, escaped to the USA

Hamburger, Hans Ludwig: To Britain in 1939.

Helly, Eduard: To United States in 1938.

von Hippel, Arthur: Emigration 1933

Landau, Edmund: Died 1938 in Berlin.

Lasker, Emanuel: Emigration 1933

Ledermann, Walter: Oral examination 1933 by Schur and by Bieberbach (in nazi uniform). 1934 to St. Andrews,

Loewner, Karl: Moved to USA

Lukacs, Eugene: Vienna to USA.

Lukasiewicz, Jan: Fled Poland 1939.

Menger, Karl: In 1938, USA

von Mises, Richard: 1933 Istanbul, 1939 USA Harvard,

Muentz, Chaim (Herman): In 1933 to Leningrad, to Sweden;

Neugebauer, Otto: Copenhagen 1934. Zentralblatt. Founded Mathematical Reviews.

Noether, Emmy: 1933 dismissed, emigration USA, Princeton

Prager, William: 1933 to USA.

Pringsheim, Alfred: 1939 to Zurich.

Rademacher, Hans: 1934. United States.

Rado, Richard: 1933 emigration to England.

Reichenbach, Hans: 1933 to Turkey and 1938 USA.

Rogosinski, Werner Wolfgang: 1937 invitation to Cambridge.

Schur, Issai: 1939 emigration to Palestine,

Schwerdtfeger, Hans: 1939 from Prague to Australia and Canada.

Siegel, Carl Ludwig: 1940, Denmark, Norway, USA

Szasz, Otto: 1933 USA

Szegoe, Gabor: From Koenigsberg 1934 to USA;

Toeplitz, Otto: 1939 Jerusalem

Wald, Abraham: Vienna to USA.

Weyl, Hermann: 1933 Goettingen, emigration to USA,

Zorn, Max: 1933 to USA.

Zygmund, Antoni: In 1940 from German controlled Poland to USA;

Als Hilbert 1934 von dem NS-Reichsminister Rust gefragt wurde, ob das mathematische Institut durch den Weggang der Juden und Judenfreunde gelitten habe, gab Hilbert zur Antwort: "Jelitten? Dat hat nich jelitten, Herr Minister. Dat jibt es doch janich mehr!"

Asked by NS-Secretary Rust whether the mathematical institute had suffered by the loss of the Jews, Hilbert answered: „Suffered? That did not suffer, Mr. Secretary. It doesn’t exist anymore.“