

Die Nacht der Scheiterhaufen: 10 May 1933. **Greatness and Tragedy of the German Mind** **— The Case of German Mathematicians —**

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Abstract: There is general recognition that German scientists and scholars of the 18th, 19th, and early 20th century were eminent, even preeminent, in their respective fields of study. One purpose of this paper is to document this greatness of the German mind for the case of German mathematicians. Another purpose is to examine why the events of the night of 10 May 1933 occurred. That night German university students in Berlin, Munich, Göttingen, Hamburg, and elsewhere, incited by their professors, built bonfires and burned the books of German and other authors whose thoughts were deemed “unGerman”. How could a mind as great as the German mind burn its own production? Why would it destroy itself, for after 1933 the greatness of the German mind practically vanished from international eminence. Sixty-six later, we are still waiting for its renaissance.

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“Of all who hitherto searched for Truth, it is the mathematicians alone who have been able to find a number of proofs, whereupon it follows that their subject matter must have been the easiest.”

— Descartes

Die Nacht der Scheiterhaufen: 10 May 1933.
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1. Introduction

During the night of the 10th to the 11th of May 1933, at universities all across Germany university students, aided, even incited by their professors (see Krockow, 1983), burned books containing “unGerman” thoughts. The citadel of the mind burned the mindful works of others. Many of these books were authored by absolutely preeminent German scientists, scholars, and literati. They included the works of Jew and non-Jew alike. Why did German students and professors, why did the German mind commit itself to the flames in an orgy of self-destruction? — a destruction from which it has yet, sixty-six years later, to reemerge.

Apart from telling the story of the book burning itself (section 2), there are two purposes to this paper. First, we intend to demonstrate the preeminence of German mathematicians in particular (section 3). We do this in a three-fold way: (a) we list the “great” mathematicians of the world by national origin (not state origin); (b) we examine where the great mathematicians studied and taught; and (c) whom they trained and where the ones they trained came from and went to teach. It is our hypothesis that the following pattern will emerge: (i) a very large number of great mathematicians are German, of German descent, or of direct German heritage or lineage; (ii) non-German great mathematicians primarily studied mathematics at universities within the Germanic territories or, at a minimum, supplemented their studies at German universities; and (iii) that after 1933, great German mathematicians nearly completely disappear from Germany and take domicile elsewhere in the world, especially in England and the US, where they trained those mathematicians that are considered today’s great mathematicians.

We address our second purpose in section 4. During Hitler’s *Third Reich* Germans not only and not merely engaged in a holocaust against six million Jews, six million other minorities, 20 million Russians, and uncounted others. Germans also engaged in a holocaust against their own mind. They destroyed German’s mental being as thoroughly and ruthlessly as they destroyed Jew’s and other people’s physical being. Why did the night of the 10th of May 1933 happen? What set of events led to a mind set that would permit the destruction of that eminently accomplished, glorious, nearly incomparably powerful mind and intelligence that the German nation achieved? Section 5 concludes this paper: is the German mind dead? if so, can it be revived? can the whole shameful affair happen all over again if not in Germany, then elsewhere? what are the prospects? what are the duties of today’s academicians and their academies?

As already suggested we choose to focus on German mathematics and German mathematicians. Mathematicians are but one slice of the preeminent German mind or intellect. The German mind produced astounding accomplishments and corresponding acclamation in nearly every field of scholarly inquiry and artistic expression. In the 1600s, 1700s, 1800s, and early 1900s, it was unthinkable for any aspiring, talented mind not to study German (or Latin) in order to read German scholars’ work or to go study in Germany at the feet of the German *Herr Professor*. In theology, philosophy, and social thought, in engineering, physics, chemistry, botany, psychology, mathematics, and other fields of inquiry, the German mind reigned. In addition, German literature was well regarded and German music unparalleled — need one even mention Bach, Beethoven, Mozart, Haydn, and Händel? To be sure, the French and British in particular produced first-rate scholars also,

but no nation produced so overwhelming a number of so overwhelmingly accomplished scientists, scholars, and artists of so overwhelming acclaim in such a concentrated time span (the 1700s and 1800s) than the German nation did.

A highly important clarification is needed up-front. When referring to “German” mathematicians, we do not mean German as in those belonging to the contemporary German *state*! We mean those belonging to the German *nation*, a set defined by culture and language not by modern state boundaries. German mathematicians, those of the German nation, are to be found in what today — and then — was French territory, or Polish territory, or Russian territory, or Austria-Hungarian, or Swiss, or Czech territory. One must recall that what has become the Germany of today did not exist until 1871 when Bismarck unified a variety of German territories and principalities, political splinters all, but all sharing German language and cultural precepts.

2. The Book Burning

Let us start with the event itself. Book burning was not a new event on 10th May 1933. It comes with a long, if sad, history. Neither did book burning, and its companion, book banning, stop after 1933, and to this practice the United States is no stranger at all (see figure 1 in Appendix B). Readings and materials are rarely available in completely unrestricted form. Soviet-ruled eastern Europe had its restrictions; apartheid-era South Africa had its lists of banned books and book confiscations; school districts in the United States today keep certain books off school reading lists and library shelves. Even an Internet web page dedicated to the topic of banned materials censored itself and deleted links to pornographic material.

Appendix B contains copies of a few archival photographs (figures 2 and 3) of the event itself. Figure 4 is a photograph showing copies of some of the burned books. The books displayed in the figure are, from left to right:

Top row:

- Franz Werfel, *Nicht der Mörder, der Ermordete ist schuldig*
- Ernst Toller, *Hoppla, wir leben!*
- Kurt Tucholsky, *Deutschland Deutschland über alles*
- Leonhard Frank, *Das Ochsenfurter Männerquartett*

Middle row:

- Heinrich Mann, *Der Untertan*
- Alfred Döblin, *Berlin Alexanderplatz*
- Franz Jung, *Die Eroberung der Maschinen*
- Walter Benjamin, *Einbahnstraße*
- Egon Erwin Kisch, *Der rasende Reporter*

Bottom row:

- Thomas Mann, *Deutsche Ansprache. Ein Appell an die Vernunft*
- Thomas Mann, *Mario, der Zauberer*
- Erich Maria Remarque, *Im Westen nichts Neues*

- Johannes R. Becher, *Ewig in Aufruhr*

The destruction of the mind did not end with the book burning itself. Figure 5 shows Nazi officials raiding a library to rid it of unGerman books. Almost all libraries were cleaned this way.

In May, 1933, the Nazi party decreed that any book, "which acts subversively on our future or strikes at the root of German thought, the German home and the driving forces of our people..." was to be burnt. Students carrying banners toured the streets, rifling libraries, synagogues, and private homes. Works of philosophers, rationalists, poets, and internationally acclaimed authors, which had until then formed part of universal studies, were thrown into the flames. Some of the authors targeted in the book burning campaign are listed below."¹

Albert Einstein	Alfred Kerr	Erich Maria Remarque
Harvelock Ellis	Jack London	Margaret Sanger
Lion Feuchtwanger	Heinrich Mann	Arthur Schnitzler
Sigmund Freud	Thomas Mann	Upton Sinclair
André Gide	Karl Marx	Jakob Wasserman
Franz Kafka	Hugo Preuss	H. G. Wells
Erich Kästner	Marcel Proust	Stefan Zweig
Hellen Keller	Walter Rathenau	Emile Zola

The list of books burnt includes works by German and non-German Jews, by the American women's rights activist Margaret Sanger and by one Magnus Hirschfeld for his "sympathetic studies of homosexuality".²

In Berlin, Nazi Propaganda Minister Joseph Goebbels gave a speech to the students:³

"... The era of extreme Jewish intellectualism is now at an end. The breakthrough of the German revolution has again cleared the way on the German path ... The future German man will not just be a man of books, but a man of character. It is to this end that we want to educate you. As a young person, to already have the courage to face the pitiless glare, to overcome the fear of death, and to regain respect for death — this is the task of this young generation. And thus you do well in this midnight hour to commit to the flames the evil spirit of the past. This is a strong, great and symbolic deed — a deed which should document the following for the world to know — Here the intellectual foundation of the November [Democratic] Republic is sinking to the ground, but from this wreckage the phoenix of a new spirit will triumphantly rise ..."

The speech and book burnings were accompanied by singing of Nazi songs and anthems.

¹ Source: <http://holocaustcenter.org/htdocs/holocaust/exhibit1a.shtml>

² Source: <http://www.mcs.mq.edu.au/content/Sydney/knox/Burningbooks.html>

³ Source: <http://www.historyplace.com/worldwar2/holocaust/h-bookburn.htm>

Already in 1823, the great German-Jewish poet, Heinrich Heine, had declared: “... dort, wo man Bücher verbrennt, verbrennt man auch am Ende Menschen” (“... where one burns books, one will, in the end, burn people.”) (quoted from Krockow, 1983, p. 9).

And John Milton writes in *Areopagitica*, “... who kills a man kills a reasonable creature, God's image; but he who destroys a good book, kills Reason itself, kills the Image of God ...” Of course, in our modern days of intellectual disinterest, Joseph Brodsky's dictum stings: “There are worse crimes than burning books. One of them is not reading them.” But in 1933 the point was that people and professors and their students *were* reading books and that was deemed subversive and treasonous.

The book burning took place at universities all over Germany, e.g., Hamburg, Munich, Göttingen and, of course, at Berlin University. The Berlin burning took place opposite the university's main entrance at Opernplatz (Opera Place), in the plaza between the main entrance to Berlin University and the main entrance to the *Deutsche Staatsoper* (German Opera House), i.e., right in-between the centers of intellectual and artistic life of Europe! Alexander von Zemlinsky was music director at the *Staatsoper*. Zemlinsky, himself a leading music light of the time, was brother-in-law and mentor of Arnold Schönberg, inventor of the twelve-tone-music and, thus, of modern classical music. (Schönberg was working at the Prussian Academy of Arts and fired in 1933.)⁴ Some 20,000 books were burnt that night on Opera Place alone, including works by Heinrich Heine, Kurt Tucholsky, Erich Kästner, Heinrich and Thomas Mann, and Bertolt Brecht (Brecht being the one who rewrote how one performs theater).

During East-German rule Opera Place was renamed to Bebel-Platz in honor of a leader of the German workers' movement. Today, it is still called Bebel-Platz and it contains a memorial, built in 1994, to the book burning, namely a glass plate let into the pavement through which one may view an underground library — the library consists of empty shelves.⁵

The cleansing of Germany of unGerman thought was not restricted to books and scholars as the example of the musicians Schönberg and Zemlinsky (both went to the US and died there) or the naming of famous German and non-German authors already illustrates. It was part of a deliberate, systematic pogrom against all cultural achievements since “culture” in Germany and Europe of the time, and even today, encompasses all intellectual activity regardless of whether it is expressed as science, as scholarship, or as art. Indeed, one fondly recalls the image of Einstein playing his violin accompanied by the Queen of Belgium [check source]. This intricate and intimate junction of culture — science, scholarship, and the arts, what in the US today is commonly referred to as the liberal arts ideal — is a direct descendent of commonly and long held European notions of learning, and found its highest expression in the founding of Berlin University in 1810 — direct predecessor to the modern liberal arts university in which teaching and research is jointed in a single institution.⁶

⁴ Source: “http://www.jmw.at/vertreibung_und_exil__sterreic.html”

⁵ Source: <http://www.freizeitpark.de/pages/kultur/pageskultur/sehenswuerdigkeiten/bebelplatz.html>

⁶ Much of the material on Berlin University mentioned later on was obtained from <http://www.hu-berlin.de/>

3. The Case of German Mathematicians

We now turn to the extraordinary stature of the German mind, especially to the case of German mathematics and mathematicians.

A quantitative assessment of German mathematics

In what follows, we present a simple frequency count of “great” mathematicians, ordered by date of birth and national origin (not *state*, but national or ethnic origin). We then look at a number of “teacher-student trees,” that is, we trace who taught whom where and who was taught by whom. With these two procedures we hope to demonstrate, in accordance with our theses, that (a) German mathematicians indeed were among the most prominent and important, especially in the 1800s and early 1900s, and (b) that non-German great mathematicians almost invariably acquired their mathematical training in Germany, made their career in Germany, and/or published their major works in German (i.e., after Latin ceased to be the *lingua franca*, non-German scholars had to learn German).

The primary source of information we used is a huge database on mathematicians maintained at St. Andrews’ University in Scotland.⁷ For convenience, we define everyone listed in that database as a “great” mathematician. There are several problems with this database. First, the database may suffer from selection bias. After all, the mathematicians to be included must be selected by someone, and the selection criteria are not mentioned on the web site. Second, the database includes not only mathematicians *per se* but also a fair number of physicists (e.g., Einstein), astronomers (e.g., Hubble), statisticians (e.g., RA Fisher), philosophers (e.g., Wittgenstein) and even a few economists (e.g., Tinbergen), whose worked was carried out largely in mathematical mode. Third, the database lists the birthplace of the mathematician, followed by a country. But this causes problems in that for instance every person born until 1945 in the city of Königsberg must be counted as German, not as Polish. Similar assignment problems emerge for many Poles, many Hungarians, and almost all Austrians and Swiss. It is for this reason that Austrians and Swiss disappear completely from our table 1 because they are either German, or French, or Italian by ethnic or cultural assignment.

Whereas reassignment from Pole to German is easy in the case of Königsberg, others of our reassignments surely can be questioned. A prominent example is Kurt Gödel, born in 1906 in what then was the city of Brünn, Austria-Hungary, but now is Brno in the Czech Republic. In 1923, he entered the University of Vienna. In either case, German was his native language. Another case is that of Johnny von Neumann, born János von Neumann, in Budapest, Hungary, in 1903. His first name is Hungarian, the last name German. But reading a biography of von Neumann, it becomes clear that the ethnic assignment is Hungarian (Magyar). At home, as at school, the native language was Hungarian yet he learned German and French through his nannies. His mathematical education and professional development, however, took place in Germany, at the universities of Berlin, Göttingen, and Hamburg and in Zurich, Switzerland. He received his mathematics Ph.D. from Budapest yet hardly ever studied there.

⁷ [Http://www-history.mcs.st-andrews.ac.uk](http://www-history.mcs.st-andrews.ac.uk)

But, for Hungarians, the assignment problem also works the other way around. Many born with German names, for example Kornél Löwy (1893-1974) changed their names to Hungarian forms (Löwy thus becomes Cornelius Lanczos) in reaction against the usage of German names in Hungary. But Löwy was of Jewish origin, forbidden at the time to teach at a Hungarian university (in 1921). Löwy went to teach in Germany proper (Freiburg, Frankfurt, and Berlin), only to be displaced there later during the Hitler years. (Löwy went to Purdue in Indiana and eventually ended up in Dublin, Ireland).

The assignment situations are even more complex for other East Europeans. Are Ukrainian-born mathematicians Ukrainian or Russian or something else yet? Consider Mikhail Krawtchouk (1892-1942), born in Chovnitzky, Ukraine. In 1918, an independent Ukraine was proclaimed with Kiev as its capital. By 1919, the Bolshevik Red Army captures Kiev; by 1920 the Poles capture Kiev, but are driven back and Kiev declares an independent Ukraine yet again. Eventually, the USSR incorporates Ukraine. Krawtchouk is accused of being a Polish spy and bourgeois to boot. He is stripped of positions, memberships, and privileges and imprisoned and dies in the Siberian Gulag in 1942. But in 1992, a newly independent Ukraine restores his membership in the Ukrainian Academy of Sciences.

Similar problems could arise with English names for those who are Scot, Welch, English, or Irish. Fortunately, the database at St. Andrews leaves those ethnic assignments much less ambiguous. With these database problems in mind, table 1 presents the simple frequency count of eminent or “great” mathematicians.

Table 1: Frequency count of “great” mathematicians*

	1600's	1700's	1800's	1900's	Total
Danes	3	1	13	1	18
French	34	73	69	16	192
Germans	11	26	150	30	217
Hungarians	0	1	14	12	27
Irish	3	1	13	1	18
Italians	13	10	42	2	67
Dutch	8	1	10	4	23
Poles	0	1	9	15	25
Russians	1	3	40	25	69
Scots	8	8	17	4	37
English	20	20	94	41	175
Ukrainians	0	0	8	14	22
US	0	1	49	49	99
Others *	3	8	56	39	106
Sum	104	154	584	253	1095

Source: <http://www-history.mcs.st-andrews.ac.uk/history/BiogIndex.html>

Note: There is no guarantee that this source is free of selection bias. Moreover, it also includes a great number of physicists, even economists who — even though not formally mathematicians — made the great use of mathematical thinking in their work. One thinks of Albert Einstein as a prime example.

- “Others” are listed in Appendix A.

Table 1 suggests, as we claim in our **first** hypothesis, that we can fairly state that a large number of great mathematicians were German, or of direct German heritage or lineage.

Another way of assessing influence within and among mathematicians is by constructing teacher-student trees, i.e., to identify who studied where, with whom, and went on to teach where and taught whom? Again, however, things are not that simple since in Europe it was entirely common, and even expected, that students would travel from university to university (in different countries) to visit the famous professors of the time that they wanted to study with. Moreover, after receiving a first degree, a young researcher might take up a post as assistant to a full professor and teach in behalf of, but also study under, this professor. During this time, or after receiving a second degree, it was common to travel some more on a fellowship year or two to study at yet another place under yet more professors before submitting work for a doctorate or “habilitation” and settling down for one’s own appointment as professor.

Our **second** hypothesis claims that non-German great mathematicians primarily studied mathematics at universities within the Germanic territories or, at a minimum, supplemented their studies at German universities. For the data that we have been able to look at (mathematicians born between 1880 and 1957), this is only partially true. French and English mathematicians (i.e., English, Welsh, Scot, and Irish) tend to follow a model of self-reliance. Relatively few of them went to Germany (or anywhere, for that matter) for additional study. In other words, British mathematicians grow up in Britain, study in Britain, and stay in Britain. Cambridge University (especially Trinity College within Cambridge) is the undisputed mathematics hub, with secondary centers at the various universities in London, and at Oxford, Manchester, and Edinburgh. It is only with the WW II and follow-on generation of British mathematicians, i.e., those who received their mathematics training in the 1960s and thereafter, that Princeton, Chicago, and UC Berkeley become regular education and career-post stops. As regards France, the primary French center for mathematics education was and is at the numerous Parisian schools and universities. Like the British, the French tend to study and stay in France. This is true even for the period after WW II.

Regarding mathematics in the US, the teacher-student trees yield interesting observations. The foremost mathematicians in the US were Veblen (1880-1960), Birkhoff (1884-1944), and MacLane (1909-). Veblen taught Church, Franklin, Alexander, R Moore, and Wedderburn. Birkhoff (1884-1944) taught Whitney, Stone, and Morse. MacLane taught Thompson, Gorenstein, and Lyndon. Veblen himself had three important teachers, the American Eliakim Moore and two Germans (Bolza and Maschke), who themselves came out of the great German mathematics tradition in Berlin and Göttingen of the mid-1800s (Weierstrass, Kummer, and Kronecker — the Berlin triumvirate). Birkhoff’s teachers included E. Moore, Bôcher, and Osgood (Americans) and again Bolza and Maschke. MacLane studied under E. Moore and two Germans (Bernays and Weyl in Göttingen). So, where did E. Moore, Bôcher, and Osgood study? Moore studied in Berlin under Weierstrass and Kronecker, Bôcher in Göttingen under Klein, Schönflies, Schwarz, Schur, and Voigt, and Osgood

in Göttingen with Klein and Max Noether. In every instance, the lineage of American mathematics goes back to Germany and only to Germany.

Hungarian mathematicians are very important in the universe of mathematics. For the data we analyzed (1880-1957), the following “greatest of the great” Hungarian emerge: F Riesz (1880-1956), Fejér (1880-1959), Pólya (1887-1985), Szegő (1895-1985), Wald (1902-1950), Wigner (1902-1995), and v. Neumann (1903-1957) studied, without exception, either solely or for the majority of their studies at German universities. After v. Neumann, there is only one other significant Hungarian mathematician (Kemeny, 1926-1992) who studied solely in the US. The others after v. Neumann studied with Fejér, Pólya, or v. Neumann or studied in England and the US. As in the case of the US, we believe it is fair to conclude that Hungarian mathematical genius was brought to flower almost exclusively at German universities.

Russian mathematics is a mixture of the French/British and the US/Hungarian cases. The Russian revolution, and the eventual establishment of the USSR, certainly resulted in an incredibly inward-looking system of mathematics education. However, the greatest names of Russian mathematics for our time-period (1880-1957) arise before the USSR was fully established. They are, without doubt, these: the great Nikolai Nikolaevich Luzin (1883-1950). Virtually *every* important Russian mathematician since came out of Luzin’s school that he founded with his own great teacher, Egorov (1869-1931). Egorov, in turn, was taught by Bugaev (1837-1903) who, in turn, studied under Kummer and Weierstrass in Berlin (and Liouville in Paris). With very few exceptions, virtually every other Russian mathematician of note can be traced back to Luzin. The exceptions include Friedmann (1888-1925) who studied in St. Petersburg under the great German Ehrenfest and in Leipzig, and Plessner (1900-1961) who studied solely at German universities (Giessen, Göttingen, Berlin, and Marburg) and the only reason he went to teach in Moscow was because the Senate of Giessen refused to appoint a Russian to a professorship.

The final block of major mathematicians are Polish. It is also the most tragic of all stories since, in this time period, Poland was hit, quite literally, right (from Russia) and left (from Germany). The center of Polish mathematics clearly was in Warsaw, and to a lesser extent in Krakow and Lvov. But Warsaw was variously occupied by Russians and Germans. The Russians fired all Polish teachers, the language of instruction changed to Russian, and so did the teachers. The Germans simply closed the university altogether, and the Poles formed, under threat of death, a famous underground university that produced great mathematicians and mathematical results. In these circumstances, it could not be avoided that Polish mathematicians received a good measure of their education elsewhere. In the following comprehensive list of all Polish mathematicians in the data set, note the gradual shift from German speaking universities to English speaking universities.

Sierpinski (1882-1969)	Warsaw, Krakow
Steinhaus (1887-1972)	Göttingen
Janiszewski (1888-1920)	Zurich, Munich, Göttingen, Paris
Mazurkiewicz (1888-1945)	[Poland?]
Banach (1892-1945)	Krakow
Bergman (Pole?) (1895-1977)	Berlin
Kuratowsky (1896-1980)	Glasgow, Warsaw

Post (Pole?) (1897-1954)	City College, Columbia
Saks (1897-1942)	Warsaw
Bochner (1899-1982)	Warsaw, Berlin
Schauder (1899-1943)	Lvov
Zygmund (1900-1992)	Warsaw
Tarski (1902-1983)	Warsaw, Harvard
Zarankiewicz (1902-1959)	Warsaw
Hurewicz (1904-1956)	Vienna
Borsuk (1905-1982)	Warsaw
Mazur (1905-1981)	Lvov
Bronowski (1908-1974)	Cambridge
Ulam (1909-1984)	Lvov
Wolfowitz (1910-1981)	NYU
Jacobson (1910-)	Alabama, Princeton
Mostowsky (1913-1975)	Warsaw, Vienna, Zurich
Kac (1914-1984)	Lvov
Rasiova (1917-1994)	Warsaw
Herstein (1923-1988)	Manitoba, Toronto, Indiana
Mandelbrot (1924-)	Paris, Lyon, CalTech

In sum, one can fairly say that with the exception of France and Britain, great mathematics is German mathematics, at least when traced back to those born in 1880 or later. (Further on in this paper, we provide a qualitative assessment of German mathematics. We also plan to continue our teacher-student tree analysis by pushing the birthyears back to 1800 and beyond.)

Our **third** hypothesis claims that after 1933, great German mathematicians nearly completely disappear from Germany and take domicile elsewhere in the world, especially in England and the US, where they trained those that are considered today's great mathematicians. This thesis consists of two parts, the first of which clearly is confirmed as we demonstrate below. But it is less clear that today's great mathematicians were directly trained by those who fled the terror of the Hitler years.

What happened after 1933? German mathematicians vanish almost completely from the scene of mathematical greatness. Instead we see a resurgence of British and French, and the emergence of US mathematicians. One piece of evidence comes simply from listing German mathematicians born in or after 1912. Someone born in 1912 would enter university about 1930 and be in the midst of studies by 1933. The data bank lists the following:

- Zassenhaus (1912-1991); studied in Hamburg; ended up teaching in Canada and the US
- Teichmüller (1913-1943); a committed Nazi, studied in Göttingen and Berlin; died in the war
- H. Neumann (1914-1971); studied in Berlin; fled and worked in England, the US, and Australia
- A. Robinso[h]n (1918-1974); studied in Palestine, Paris, and London; worked in Israel, Canada, and the US
- Kreisel (1923-); studied in Cambridge; worked in England, US, and France
- Cohn (1924-); studied in Cambridge; worked in France, England, US, Canada, India, Israel and

had one stint in Bielefeld, Germany

- Klingenberg (1924-); studied in Kiel, Hamburg, and Rome; worked in Germany and US
- K Roth (1925-); studied in Cambridge and London where he also worked
- Grothendieck (1928-); studied in France; worked in Brazil, US, and France
- Selten (1930-); studied in Germany and US; worked in Germany (Germany's only Economics Nobel-Laureate)
- Faltings (1954-); studied in Germany and US; worked in Germany, now at Princeton.

For our time-period of particular interest, 1800-1957, i.e., 158 years, the data bank includes 180 German mathematicians. For the 112 years from 1800 to 1911, we identify 169 German mathematicians of note; but for the 46 years from 1912-1957, there are only the eleven listed above.

Another piece of evidence comes from the list of recipients of the Fields medal (see table 2). The Fields medal was first awarded in 1936, then in 1950 and every four years thereafter. The Fields' medal is awarded only to mathematicians under the age of 40 (comparable to economists' John Clark Bates medal, awarded biannually by the American Economic Association to an economist under 40) and is mathematicians most prestigious prize, its "Nobel Prize."

Table 2: Fields Medal Winners, 1936-1998

1936 L V Ahlfors (Finn)	1970 A Baker (US)	1990 V Drinfeld (Ukrain)
1936 J Douglas (US)	1970 H Hironaka (Jap)	1990 V Jones (New Z)
	1970 S P Novikov (Russ)	1990 S Mori (Jap)
[no awards during WWII]	1970 J G Thompson (US)	1990 E Witten (US)
1950 L Schwartz (F)	1974 E Bombieri (Ital)	1994 P-L Lions (F)
1950 A Selberg (Norw.)	1974 D B Mumford (Engl)	1994 J-C Yoccoz (F)
		1994 J Bourgain (Belg)
1954 K Kodaira (Jap)	1978 P R Deligne (Belg)	1994 E Zelmanov (Russ)
1954 J-P Serre (F)	1978 C L Fefferman (US)	
	1978 G A Margulis (Russ)	1998 R Borcherds (Engl?)
1958 K F Roth (G)	1978 D G Quillen (US)	1998 T Gowers (Engl?)
1958 R Thom (F)		1998 M Kontsevich (Russ?)
	1982 A Connes (F)	1998 C McMullen (US?)
1962 L V Hörmander (Sw)	1982 W P Thurston (US)	
1962 J W Milnor (US)	1982 S-T Yau (Chinese)	
1966 M F Atiyah (Engl)	1986 S Donaldson (Engl)	
1966 P J Cohen (US)	1986 G Faltings (G)	
1966 A Grothendieck (G)	1986 M Freedman (US)	
1966 S Smale (US)		

Source: <http://www-history.mcs.st-andrews.ac.uk/history/Societies/FieldsMedal.html>

Among the Fields' medal winners, Germans are conspicuous by their absence from the ranks. Of the forty-two winners, there are 12 Americans, six French, five British, four Russians, and only one pure German who actually did the work for which he was cited in Germany. Contrast this to the 29 Nobel-Prizes awarded between 1901 and 1954 by faculty who were, until 1933, associated at one point or another with Humboldt-University (the former Berlin University). There are two other Germans in the Fields medal rankings, K. F. Roth who was born in 1926 in what was then the German city of Breslau, but is now — again — in Poland. However, Roth emigrated as a child and went to school in England where he did all his mathematical work (his early teacher being another emigre German). The 1966 winner, Alexander Grothendieck was born in 1928 in Berlin. His father was Russian (and murdered by the Nazis). Grothendieck moved to France in 1941, 13 years old, and received his entire mathematical training in France. That leaves the 1986 winner, G. Faltings (born in 1954 in Münster). The work that eventually would bring him the Fields medal was done in 1983 in Germany. Faltings accepted a professorship and moved to Princeton in 1985. Stretching a bit, one might consider Maxim Konsevich, a 1998 recipient of the Fields medal. Although not German, did receive his mathematics PhD from the University of Bonn.

We suggest that one may conclude without much controversy, and in line with the first part of our **third** hypothesis, that German mathematicians, especially in the 1800s and the early 1900s held world rank. But after 1933, German mathematics vanishes almost completely in international importance. It becomes mediocre. Evidence in support of the second part of the third hypothesis — that many of today's great mathematicians were taught by emigrés, German emigrés in particular — is insufficient. The data bank we have simply does not contain sufficient detail on the teachers and their origin of today's mathematicians. That data would have to be separately assembled.

A qualitative assessment of German mathematics

Frequency tables and teacher-student trees are quantitative data. To get a qualitative impression of the work of German mathematicians, one must take different approaches. For instance, Karl Weierstrass (1815-1897), Professor of mathematics at the University of Berlin, was famous not only for his mathematics (and much appreciated for paying his students' drinks at the local pub) but was famous also for being an extraordinary teacher. Students of his who would become famous mathematicians of their own included Kovalevskaya, Bachmann, Bolza, Cantor, Engel, Frobenius, Gegenbauer, Hensel, Hölder, Hurwitz, Killing, Klein, Kneser, Königsberger, Lerch, Lie, Lueroth, Mertens, Minkowski, Mittag-Leffler, Netto, Schottky, Schwarz and Stolz, not to mention the US and Russian schools that found their beginning in Berlin and Göttingen.

Clearly, a variety of approaches can be chosen to assess the qualitative contributions of German mathematics. We choose to look at the accomplishments and influence of eight mathematicians in particular, in this case reaching back to the 1600s:

1. Gottfried Leibniz (1646-1716)

-
2. Johann Carl Friedrich Gauss (1777-1855)
 2. Georg Friedrich Bernhard Riemann (1826-1866)
 4. David Hilbert (1862-1943)
 5. Emmy Noether (1882-1935)
 6. Richard Courant (1888-1972)
 7. Kurt Gödel (1906-1978) and
 8. Johnny von Neumann (1903-1957; as a non-German, but German-trained)

These eight are arbitrarily selected but it is our judgment that few mathematicians would dispute the eminent stature of the eight chosen. Our objective is not to rehash the arcane mathematical accomplishments of these geniuses, but to relate the pervasive influence and importance of their achievements in today's everyday life.

[Dharma: fill in details]

4. Why 10th May 1933?

Searching for information and literature on the subject, one finds little even about the event itself. One finds almost nothing about *why* it happened. Here, then, is one attempt. We trace the roots of 10 May 1933 back some three-hundred years. Europe's Thirty Years' War ended in 1648 with the Peace of Westphalia. It ended Ferdinand III's role as ruler of the Holy Roman Empire (the *First Reich*), even though he formally remained emperor. Instead, the Holy Roman Empire broke up and resulted in some 240 mutually independent kingdoms, duchies, principalities, margroves, and the like. Instead of professing to a common religion, Roman Catholicism, all 240 rulers now were free to proscribe the religion the citizens of their own territory were to adopt. Some territories stayed with Roman Catholicism, others adopted Luther's religious precepts. But Calvinism and Anabaptism were shunned and banned; their religious puritanism was threatening to princely rulers. We see here the beginning of *state-religion*, religion by the grace, and in the service of, the state.

Over time the Habsburgs came to dominate among the princes of the South (Austria) and, after the defeat of Ottoman Turks, also in Hungary; under their leadership, the South and Southwest largely went Roman Catholic. The Hohenzollern clan came to dominate among the princes of the North (Prussia) and largely went Lutheran. Luther's translation of the Latin bible became the start of a movement to unify the Germanic languages into what was to develop into today's *High German*.

In 1701, Prussia becomes an independent kingdom under King **Frederick I**. His successor, King **Frederick William I** (1688-1740; king: 1713-1740) developed Prussian industry, consolidated local budgets and finances under central royal authority; created the powerful Prussian military forces; and instituted compulsory elementary education in Prussia. The reason for this was that the king needed an educated elite to administer the kingdom, i.e., the king ruled, but the bureaucrats governed the country. In addition to the notion of a *state-religion* we see here the beginning of *state-education*, i.e., education not primarily for the benefit of the individual but for the benefit of the state and its rulers.

Frederick II (1712-1786; king: 1740-1786) received the nickname, *The Great*. Doubtless, here was an extraordinary individual. An accomplished musician, composer, and flutist, he was also a prolific writer of philosophical and political treatises (the collected works run to some thirty volumes). His treatise *Antimachiavelli* was published by Voltaire in Voltaire's name. He greatly admired the American revolution and George Washington. Frederick II preferred life in his palace *Sans Souci* ("carefree") near Berlin. He disdained the German language; at his court, one spoke French as he was a great lover of all things French. He instituted a system of *equal justice* at the Prussian courts; he was an extremely efficient administrator, supported the arts and sciences, but also greatly expanded the Prussian military forces. Despite his admiration for Washington and despite his *Antimachiavelli*, upon gaining the throne in 1740, Frederick II almost immediately launched into a series of battles against Maria Teresa of Habsburg Austria to acquire territory. Prussia became a major military power; moreover, it became an *independent* major military power, able to fight and win without allies. At one point Prussia fought and won a series of battles against the allied forces of Austria, Russia, Sweden, Saxony, and France. With this military might, Frederick II succeeded in collecting German princes in 1785 into a *Fürstenbund* (Assembly of Princes), of course under his own leadership. The *Fürstenbund* undermined Habsburg Austria's dominance in the Germanic territories.

What we see develop here is state-religion, combined with state-education for the purpose of literally creating a class of highly productive peasants and workers so as to be able to support the state with taxes and soldiers, i.e., able to support the creation of a *power-state* (*Machtstaat*), a *great-power* state. It was during the rule of Frederick William I and Frederick II — the 1700s — that German culture (the arts and sciences) flourishes. From the field of music one might mention a shortlist:

- Telemann (1681-1767)
- J.C. Bach (1685-1750)
- Handel (1685-1759)
- C.P.E. Bach (1714-1788)
- Gluck (1714-1787)
- Haydn (1732-1809)
- Mozart (1756-1791)
- Beethoven (1770-1827)

In literature of course there is the incomparable Goethe (1749-1832) who not only remains the greatest poet of the German language, but was an avid and accomplished scholar and scientist as well (e.g., Charles Darwin specifically acknowledges Goethe's work as a forerunner of evolution by natural selection). In terms of political philosophy, there was a growth of rationalism and scientific spirit, absorbing French and English political ideas. German writers began to discard theology, sin, and grace and adopted a secular philosophy of natural law in which rational and good humans could achieve perfection, if aided by education. The great Leibniz dealt with the topic as did the philosopher Kant (the power of reason, the rational basis for ethics), as did the great German poet Lessing (principle of tolerance).

This new strand of humanistic argument was immediately countered by strands emphasizing

individual religious piety in theology and, in literature, the birth of the romantic *Sturm und Drang* period as exemplified by the early Goethe as well as by Herder, Fichte, and Schlegel. These two strands — rationalism and romanticism — combine in the mature Goethe and in writers such as Hölderlin and Schiller which depict great individual passions but bound to and within notions of individual human freedom, responsibility, and reason.

At the end of the 1700s, then, we see among German intellectuals (a) enlightenment ideas of representative government bound up with romantic passion and (b) a stress on individual freedom and liberty bound up with a distinct sense of the history of Germanic peoples as a nation. This latter notion came to the fore especially in the wake of Napoleonic conquests. For a time, even Berlin was occupied by Napoleon's forces. Thus, for the first time, a *nation-like identity and aspirations* develop among Germanic peoples.

Frederick II, the Great, was succeeded as King of Prussia by **Frederick William II** (1744-1797; king: 1788-1797) whose rule proved inept. Even though he participated in the acquisition and division of Polish territories, he lost western lands. The economy declined; the Prussian military and its might declined. He bankrupted the Prussian state. He imposed censorship on religion, on education, and on the press. Barely had a passionate German sense of *nation-state identity* been developed that it was disappointed.

Frederick William III (1770-1840; king: 1797-1840) was a very different sort of king, emulating Frederick II, the Great. Frederick William III kept Prussia neutral in the Napoleonic wars until 1807. He rebuilt the Prussian army and economy that his father had let slide. But, like his father and other forebears, he joined in the repression of liberal movements throughout Europe and joined an alliance against Napoleon. Napoleon's decline started with the losses in Moscow (1812), continued with the losses at Leipzig (1813) and finally the losses at Paris (1814). Rid of Napoleonic dominance, the Germanic states held a Congress of Vienna (1814-1815). It replaces the formal, but empty Holy Roman Empire of 240 Germanic states with a German Confederation consisting of 39 states, represented by an assembly. What should be the character of the assembly? Should it adopt French, British, and American notions of representative government, a constitution guaranteeing popular vote and representation, trial by jury, free speech in an emerging *nation-state*? The rulers of Prussia, Austria, and the new kings of Bavaria, Saxony, Hannover, and Württemberg opposed encroachment to their sovereignty and supported and instituted repressive systems against their respective subjects. Thus, even though there was an assembly in which the 39 states were represented, the rulers of those states ensured that the assembly was powerless.

In July of 1830, Paris was in revolt. The revolt spread to the new German Confederation and was met with a ban on all public meetings and petitions. In early 1848, another revolt occurred in Paris. Again it spread to the German Confederation. This time, it was sufficiently troubling to induce the kings and rulers to send delegates to Frankfurt to create a parliament. The *Frankfurt Parliament* was also known as the *Professors' Parliament* since 49 of the 600 delegates were university professors in the employ of the various kings and rulers. But the rebellions eventually were crushed, Austria dissolved the liberal constitutional assembly it had temporarily created, and Prussia under Frederick William IV imposed an authoritarian constitution.

Meanwhile, the Frankfurt Parliament continued to exist. It proposed to replace the German Confederation of 39 states with the creation of a *single German nation-state* under a hereditary King.

This is the first time that the idea of a unified German *nation-state* is dramatically proposed as an actual, realizable possibility, the first time that the cultural concept of *nation* is merged with the political concept *state*! But Austria refused and exited the German Confederation altogether. In despair, the Parliament offered the Emperorship to Frederick William IV, who refused to accept it and went on to crush the rebellions that remained.

Federick William IV (1795-1861; king: 1840-1861) was Prussian king during the failed 1848 revolution. Actually, he vacillated between liberal and authoritarian constitutional styles, promising the former, but in the end supporting and instituting the latter. It was under his successor that the unification of the Germanic states into a single German *nation-state* then finally occurred.

William I (1797-1888) (King of Prussia: 1861-1888; Emperor of Germany: 1871-1888) was no friend of liberals. At his coronation he bluntly stated that he “ruled by favor of God, and no one else.” His installation as Emperor of a unified German nation-state had much to do with Otto von Bismarck (1815-1898; chancellor: 1862-1890), an extremely able aristocrat deeply loyal to the royal lineage. In a series of battles, Germany under William I defeated Denmark, Austria, Hannover, and France. William I was crowned emperor on January 18, 1871 in Versailles while German troops occupied Paris. Both William I and Bismarck were extremely militaristic, anti-democratic, and anti-Catholic. The victory against France in the war of 1870/71 allowed Prussia to unify the 39 German states into one. This unification included the southern German, i.e., Austrian-Hungarian influenced, Germanic territories and formed the *Second Reich* (see map, figure 6), and Austria-Hungarian was an independent kingdom.

But the unification came at a cost. Bismarck started a *Kulturkampf* (culture war) against the Catholics in the south. The reason was that the First Vatican Council of 1870 had just declared papal infallibility. This was a threat to Bismarck because the Roman Catholic Center party had its stronghold in the southern parts of the new Germany, and Bismarck could not tolerate potential challenges to his power by some distant pope. Already, the Catholics remonstrated against a strong, centralized state. Bismarck severely restricted the exercise of Roman Catholicism. Churches were closed, some bishops were exiled. All marriages were mandated to be state registered and sanctioned, and so on. This conflict lasted until Bismarck’s eventual dismissal in 1890.

Bismarck led similar fights against socialists, especially against the Socialdemocratic Party. Germany by now had become an industrial powerhouse. People had moved from the farm to the factory. A workers’ movement (*Arbeiterbewegung*) was emerging, taking in ideas of one Karl Marx, who was exiled following the failed revolution of 1848 (first to Paris, then to London). Eventually, the workers’ movement was undermined (bought off) by a very astute movement: Bismarck introduced social security legislation in 1871, i.e., retirement funds, sickness, and disability insurance. In one fell swoop Bismarck satisfied German workers’ immediate social security demands while deftly undercutting much of the political basis of the socialdemocratic party. Bismarck also fought against all other liberals whose patriotism he impugned. Bismarck was an extremely efficient and effective Prussian. Very much goal-oriented, he astutely maneuvered to undercut his opponents.

Bismarck’s cynical ruthlessness helped lay the foundation that would sunder apart, in 1933-1945, his own creation of a unified Germany. And so we come to the close of the 19th century — the 1800s — with Germany unified under Bismarck’s “blood-and-iron” rule. Germany under Prussian leadership became a *nation-state*, immensely powerful industrially and immensely powerful militarily. It even

began to acquire colonies (in Africa and as far as China), just like other powers before it (e.g., England, France, Spain, Portugal, and the Netherlands). Germany had made it; Germany not only was a nation-state but a *great-power* state as well.

Under the patronage of Frederick William III, Berlin University was founded in 1810⁸ by Wilhelm von Humboldt, brother of Alexander von Humboldt, the explorer after whom the Humboldt current along the eastern shoreline of Latin America is named. Wilhelm von Humboldt founded the university based on humanistic ideals, strengthened the unity of teaching and research, and introduced the notion of the liberal arts studies, precursor to all modern universities world wide.

Berlin University became a stellar university, attracting the most outstanding minds of its time. Among its former teachers are the philosophers Fichte and Hegel, the theologian and philosopher Friedrich Schleiermacher, the explorer Alexander von Humboldt, a veritable who's who of chemists and physicists, the mathematicians Kummer, Kronecker, and Weierstraß, the physicians Müller, Koch, and Virchow, all of whom commanded world wide reputation. Among its students it counted people as renowned as Heinrich Heine, Ludwig Feuerbach, Otto von Bismarck, Karl Liebknecht, Franz Mehring, Karl Marx, and Kurt Tucholsky.⁹

William II (1859-1941) (King of Prussia and Emperor of Germany: 1888-1918) became Emperor of Germany when William I died in 1888. Like his predecessors, he also favored autocratic rule. Desiring to rule Germany by himself, he dismissed the aging Bismarck in 1890 but proved inept at holding the empire in good shape.

Meanwhile, the German people, politically with limited scope under successive repressive rule throughout the entire 18th and 19th century, continued their excellence in the arts and sciences. 19th century German painting, architecture, literature, music became increasingly suffused with romanticism, a dramatic, passionate, individual introspection, often featuring the individual in struggle with society, the birth of a national identity. Indeed, this combination of passionate romanticism, unexcelled German scholarship, and newly won national identity in the form of the German great-power nation-state combines in the works of Fichte, Schleiermacher, von Schelling, and Hegel whose *Weltgeist* (world spirit) is a synthesis of nature and mind embodied in its highest form in the Prussian state. This line of thinking continued in the works of Schopenhauer and Nietzsche whose "will to power" is what makes it possible for individuals to set themselves apart from the masses, or for a people to set itself apart from the masses of other people. This national identity, combined with romantic passion, leads to early notions of racial superiority of the German people. And all this at Humboldt's *humanistic, liberal arts* Berlin University!

But it was ivory tower talk by German intellectuals. Moreover, it was only one of two strands of ivory tower talk. The other strand was of course that of humanistic freedom and rights. The professorial debate centered around the *humanistic state*, that serves its citizens for the advancement

⁸ In 1828, the university was renamed as Friedrich-Wilhelms-University, in honor of Prussian king Friedrich Wilhelm III who donated a variety of buildings and a library to the effort.

⁹ Following 1933, large numbers of scholars left the university. After the war, the increasing communist influence on the university administration led to a split within the faculty. One part stayed, the other moved to the newly founded, US financed, Free University of Berlin in what would become the western part of the city.

and greater good of the individual, and the *nation-state*, served by state-citizens (*Staatsbürger*) for the advancement and greater good of the nation-state itself.¹⁰ ***The individual's duty — and especially the civil servant's duty, and professors were and are civil servants in Germany — is not to resist for the greater good of humanity, but to conform for the greater good of the state.*** One's duty is not to become individuated, but to become a willing, able, efficient, effective cell in the larger organism that is the nation-state. Patriotic nationalism becomes one's civil duty. In contrast to *Weltbürgertum* (world citizenship) we get *Staatsbürgertum* (state citizenship).

In this intellectual conflict, the liberals tended to lose. Many were exiled, such as Heinrich Heine, the famed German poet,¹¹ and Karl Marx but also the Grimm brothers. Nowadays merely known for the Grimm fairytales, the Grimm brothers' own story is much more engrossing and enlightening than any of their tales. They held professorships at the University of Göttingen, in the Kingdom of Hannover. In the wake of the revolts of 1830 that occurred throughout the German Confederation, the kingdom had adopted a somewhat liberal constitution in 1833 but upon ascending to the throne in 1837, the new king Ernst August summarily dismissed the liberal constitution. Seven professors protested, the so-called *Göttinger Seven*, three of whom were so audacious as to let third parties know about their protest. There was a debate within the university. Most professors cowed to the new king and his rule. After abrogating their rights and obligations as men of the mind, declaring their loyalty to the new king, Ernst August dismissed the seven protesters and exiled the three that had passed on their protest. Of those three, the Grimm brothers were two. They moved to Kassel, and in 1840 accepted an invitation to move to Berlin University where they went on to extend their fame (creating, among other works, the first German dictionary).

Emperor William II, rashly, joined Austria in its war against Serbia, occasioned by the famous 1914 Sarajevo shooting of Austrian archduke Ferdinand by a Serb activist. Russia immediately pledged itself to the side of Serbia, and the *Great War* was underway with various countries joining the fight on this side or that. Prussia-Germany's immense military build-up since Bismarck's 1871 unification of Germany, its expanding blue-water Navy, its growing economic and industrial power, and its colonial great-power ambitions had worried many, especially England which joined the brawl against Germany. William II made another mistake in attacking US merchant vessels, drawing the US into the *mêlée*. By 1918, William II grudgingly appointed Max von Baden chancellor of Germany who negotiated a peace with US President Woodrow Wilson. Meanwhile, fighting continued, sailors mutinied, socialists staged strikes, workers and members of the armed forces formed Communist councils, revolution broke out in Bavaria, the country threatened to break apart from within. Von Baden announced William II's abdication and himself resigned also.

Into this vacuum stepped, at long last, the German socialdemocratic party. The nationalistic fever had collapsed; all wanted to be socialists anyway. The *Weimar Republic* was formed in 1919. It was

¹⁰ The German word *Bürger* translates, as a category of politics, as *citizen*. (As a category of economics, it carries the French notion of *bourgeois*.) What in English is referred to as *citizen*, the German language invariably refers to as "state citizen," or *Staatsbürger*.

¹¹ Heine, in 1821, foresaw the coming German catastrophe to a much greater and more precise extent than Nostradamus, the French mystic of the early 16th century, ever could dream of.

feeble from the start. Von Baden had agreed to an ignoble peace and had agreed to impossible reparations payments, insisted upon by France in particular. The republic was under constant violent threats and attacks both from military conservatives — witness Hitler's attempted Munich *Bierhallenputsch* (beer hall putsch) in 1923 — and revolutionary communists: after all, following Karl Marx and Frederick Engel's precepts, Russia had just turned into a communist workers' paradise.

Even though the 1920s proved to become a period of relative prosperity, the size of the reparations payments was unsustainably large, the French occupation of the Ruhr coal-mining area in 1923 rankled deeply, and everything came apart with the onset of the 1929 US stock market crash and subsequent world wide recession. People became frightened and upset with socialdemocratic capitalism. But what were the alternatives? The alternatives were Lenin-style Russian communism and renewed German nationalism that would assuage the grief over the loss of Germany's industrial and military great-power status. Hitler, that redoubled reincarnation of Bismarck, served the reinvigorated German nationalism very well. Even more single-minded and ruthless and ingenious in his ways than Bismarck, Hitler hated aristocrats, capitalists, communists, liberals, and non-Aryans of any kind. His *Nationalsozialistische Partei* (the Party of National Socialism, the Nazis) became the majority party in the German parliament, the *Reichstag*. Modern-day election observers might refer to those elections as “not entirely fair, but acceptable.” At any rate, the Nazis became, in elections, the majority party and Hitler was duly appointed *Reichskanzler*, or chancellor of Germany, in January 1933.¹²

Hitler immediately assumed dictatorial powers and espoused dreams of a *Drittes Reich* (the Third Reich). He shut down labor unions, censored the press, and the like, and orchestrated, through his stalwart lieutenant Joseph Goebbels, the book burning of 10 May 1933 whose objective it was to publicly demonstrate the complete banishment of all and sundry unGerman thoughts from German soil. This at a time when Berlin University was at the apex of world scientific accomplishments: as mentioned, probably unique among all universities in the world, work done by its faculty eventually were to garner 29 Nobel prizes (11 in chemistry, 10 in physics, 7 in physiology or medicine, and 1 in Literature). The professors participated in the book burning because their status as civil servants made them subservient to the political dictate of the *Obrigkeitsstaat*. The root of this flawed attitude goes back to King Frederick William I's introduction of mandatory elementary education for the benefit, not of the individual, but for the governance of the state. The creation of an elite class of civil servants to govern in behalf of the rulers came with a guarantee, always honored, of lifelong employment, unfathomable economic security, and conferred tremendous social status in status-conscious Germany. In exchange, the professors — like Goethe's *Faust* — sold their soul: as a group, the majority were incapable of resisting the tyranny that came their way. They were swept up in the cultural underpinnings of their heritage and the sweeping excitement of intellectual and seemingly racial superiority. They were wrong.

5. Conclusion

¹² As a native Berliner, I proudly add that the Nazis did *not* gain the majority vote among Berlin voters.

Summary of findings

In light of our **first** hypothesis, we believe that we can fairly state that indeed a large number of “great” mathematicians were German, or of direct German heritage of lineage.

Our **second** hypothesis claims that non-German great mathematicians primarily studied mathematics at universities within the Germanic territories or, at a minimum, supplemented their studies at German universities. This is entirely true for the US, Russian, and Hungarian schools of mathematics, partially true of Polish mathematicians, and not true for French and English mathematics, at least within the constraint of our data analysis (1880-1957). It will be instructive to trace the teacher-students trees completely back to 1800 or even to a further distance in time.

Our **third** hypothesis claims that after 1933, great German mathematicians nearly completely disappear from Germany and take domicile elsewhere in the world, especially in England and the US, where they trained those mathematicians that are considered today’s great mathematicians. This thesis consists of two parts, the first of which clearly is confirmed. With Hitler’s ascent, we note waves of emigration from what today is Switzerland, Austria, Germany, Hungary, and Poland and very few outstanding mathematicians have arisen since then in those countries. But it is less clear that today’s great mathematicians were directly trained by those who fled the terror of the Hitler years.

Why did the book-burning, and the eventual dispersion of German science and scholarship, including German mathematics, happen? What were the antecedents? In the narrative, we pick up the story with the Peace of Westphalia in 1648 to show the gradual development, in Germany, of two opposing lines of thought: one line of thought, coming out of French, British, and US political enlightenment thinkers, stressed the role of human individual liberty and freedom in the constitution of states, in which individuals own rights that can be exercised against the state, the other stressing passionate, nationalistic identification with the newly constituted great-power nation-state of which the individual is an integral part, a nation-state that secures the individual’s survival and comfort but demands, in exchange, that person’s unquestioned support, a state in which resistance is heresy and conformity is gospel. Always at odds, these opposing trends collide catastrophically during Hitler’s regime. Everything and everyone deemed somehow unGerman is banned, exiled, or destroyed.

What next?

Is the German mind dead in mathematics and in other fields of scholarship and the arts? If so, can what was be revived? Can the whole shameful affair happen all over again if not in Germany, then elsewhere? What are the prospects? What are the academy’s and academicians duties?

In mathematics, Germany today does not count as a preeminent research locale. The same can be said, fairly we believe, for almost any other field of scholarship, science, or art. Of course there are outstanding, world class individual German scientists, scholars, and artists around. But they don’t amount to lend world class status to Germany as a whole. What was destroyed under Hitler — a holocaust of the German mind — has yet to reemerge. The center of academic excellence clearly has shifted, with the emigres, from Germany to the US. At the cost of accepting a mere few hundred scientist refugees, the US reaped inconceivably large payoffs over the past nearly seventy years and itself become a world power.

Among US professors occasional reference is made to a “publish or perish” rule. Either publish lots of research and writing, or “perish” by not being awarded university tenure. Elsewhere, the dictum should read “publish *and* perish.” Published works identify and condemn the author to banishment, exile, or death. Regrettably, this is still the case in many African and Asian countries and probably accounts in large part for the continued brain-drain we witness from those countries to western, democratic nations. Accepting well-educated refugees and emigres was, and is, one of the smartest choices a country can make to further its own future.

“First they came for the socialists, and I didn’t say anything because I wasn’t a socialist. Then they came for the trade unionists, and I didn’t say anything because I wasn’t a trade unionist. Then they came for the Jews, and I didn’t say anything because I wasn’t a Jew. Then they came for me, and no one said anything because no one was left.”

— Pastor Martin Niemöller

References

1. Krockow, Christian Graf von. *Scheiterhaufen: Größe und Elend des deutschen Geistes*. Berlin: Severin und Siedler, 1983.
2. Various multimedia encyclopedias, e.g., Comptons, Encarta, Encyclopedia Britannica Online (www.eb.com).
3. <http://www-history.mcs.st-andrews.ac.uk>. A great online resource from which we drew almost all our information and constructed our tables, frequency counts, and teacher-student trees.
4. Other references are detailed in the text and footnotes.

Note

We thank Ms. Cheronda Mallett for research assistance. This is a *working* paper written by an economist and a mathematician. Comments, especially on section four, the part that begins to grapple with the intellectual and cultural antecedents of the book burning would be dearly welcome and appreciated.

Appendix A

Addendum to Table 1

“Others” in table 1 are as follows:

1600s	1700s	1800s	1900s
Belgian (2)	Belgian (1)	Algerian (1)	Argentinian (1)
Japanese (1)	Croatian (1)	Australian (1)	Australian (3)
	Czech (1)	Belarussian (4)	Belarussian (2)
	Norwegian (1)	Belgian (7)	Belgian (2)
	Portuguese (1)	Canadian (3)	Canadian (1)
	Slovene (1)	Czech (5)	Chinese (4)
	Swedes (2)	Estonian (1)	Croatian (1)
		Finnish (3)	Finnish (1)
		Grecian (1)	Gibraltar (1)
		Indian (4)	Grecian (1)
		Japanese (1)	Indian (5)
		Latvian (1)	Japanese (5)
		Lithuanian (2)	Latvian (1)
		Luxembourg (2)	New Zealander (1)
		Malta (1)	Norwegian (1)
		Moldavian (1)	Romanian (1)
		New Zealander (1)	Slovenes (2)
		Norwegian (8)	South African (2)
		Slovene (1)	Swedes (2)
		Spaniard (1)	Turkish (1)
		Swede (6)	Welsh (1)
		Welsh (1)	

Appendix B --- Photographs and Map



Figure 1: Book and Record Burning, Monticello, Minnesota; organized by three fundamentalist ministers, 1982; Courtesy People for the American Way



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Figure 2: The 20th century's most notorious book burning took place in Berlin, Germany, in 1933, during the first year the Nazis were in power.



Figure 3:
<http://www.rjgeib.com/thoughts/burning/burning.html>
(Photo credit: U.S. National Archives)



Figure 4:
<http://www.dhm.de/ENGLISH/sammlungen/bibliothek/buecher.html>



Figure 5:
<http://holocaustcenter.org/htdocs/holocaust/exhibit1a.shtml>



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Figure 6: The unification of Germany by Prussia brought most of north-central Europe into one kingdom.