

The Nazi era: the Berlin way of politicizing mathematics

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The first impact of the Nazi regime on mathematical life, occurring essentially between 1933 and 1937, took the form of a wave of dismissals of Jewish or politically suspect civil servants. It affected, overall, about 30 per cent of all mathematicians holding positions at German universities. These dismissals had nothing to do with a systematic policy for science, rather they proceeded according to various laws and decrees which concerned all civil servants alike. The effect on individual institutes depended crucially on local circumstances – see [6], section 3.1, for details.

Among the Berlin mathematicians, 50-year-old Richard von Mises was the first to emigrate. He went to Istanbul at the end of 1933, where he was joined by his assistant and future second wife Hilda Pollaczek-Geiringer who had been dismissed from her position in the summer of 1933. Formally, von Mises resigned of his own free will – he was exempt from the racial clause of the first Nazi law about civil servants because he had already been a civil servant before August 1914. Having seen what the “New Germany” of the Nazis was like, he preferred to anticipate later, stricter laws, which would indeed have cost him his job and citizenship in the autumn of 1935.

The Jewish algebraist Issai Schur – who, like von Mises, had been a civil servant already before World War I – was temporarily put on leave in the summer of 1933, and even though this was revoked in October 1933 he would no longer teach the large classes which for years had been a must even for students who were not primarily into pure mathematics. In August 1935, aged 60, he gave in to the mounting pressure and submitted the request that he become emeritus. He emigrated to Palestine in 1939 where he died two years later.

Other Berlin mathematicians who lost their jobs or the right to teach university courses during the first years of Nazi rule included A. Brauer, St. Bergmann, as well as A. Barneck and E. Jacobsthal at the Technical University.

The most tragic case within the small community of Berlin mathematicians was that of the group and number theorist Robert Remak [5] whose marvellous regulator bounds are probably better appreciated by today’s number theorists than they were in his time, and whose occasional papers on a general mathematical theory of economy have barely begun to be read. Remak had no position, only the right to lecture at the university. Even to obtain this so-called *Habilitation* had been a long and difficult process. His applications had been rejected several times. The Remak family had something of a tradition in slowly overcoming administrative hurdles at the University of Berlin. The mathematician’s parental grandfather and namesake Robert Remak had been the first non-converted Jew to obtain, in 1847, his *Habilitation* at the Berlin medical faculty. A. v. Humboldt had lent a

helping hand in his case. In the course of the first racial law, the mathematician Robert Remak lost his right to teach courses in September 1933 – altogether, he had held this right for only four years. He continued to live and do research in Berlin. After the so-called “Crystal Night,” in November 1938, he was arrested and locked into the Sachsenhausen concentration camp for eight and a half weeks. During this time his (non-Jewish) wife tried to organize a place of refuge in case of his release. This resulted in his being allowed to go to Amsterdam, which he did in April 1939. But in May 1940 the German occupation caught up with him there. He was again arrested, brought to Auschwitz, where he was put to death on some unknown day after 1942.

The dismissals were impersonal, almost Kafkaesque, in that they manifested themselves as formal applications of general laws, executed by the same efficient administrative machine that had once been the pride of the Prussian state. An analysis of the application of the first law (from 7 April 1933) even shows that one of its aims was precisely to ward off the misconception, common in particular among the storm troopers (SA), of Hitler’s seize of power as a revolution. Thus the temporary leave imposed on Schur in the summer of 1933 and his subsequent ban from large classes, are typical examples of the 1933 ministerial policy which tried to avoid Nazi student boycotts by withdrawing potential targets of such militant actions from major lecture courses. It also illustrates the pincer movement operated by the Nazi regime against its enemies: through street gangs on the one hand, and an allegedly respectable Prussian administration on the other.

But the Nazi-“revolutionaries” did not acquiesce, and would even find opportunities for direct action. This second kind of impact of Naziism on science was very different from the dismissals: much more ideological with direct attacks on scientific questions, or at least questions of scientific teaching, and more personal, without legal attire. Although there had been militant student actions against Jewish or politically disliked mathematicians before in several places (for instance, against Otto Blumenthal in Aachen), the real beginning of this second impact of Naziism on mathematics was marked by the boycott of Edmund Landau’s lecture in Göttingen on 2 November 1933. This event was to have repercussions in the following years on the German mathematical community as a whole, and on mathematics in Berlin in particular.

The number theorist Edmund Landau was himself a Berliner, whom Klein and Hilbert had brought to Göttingen as Minkowski’s successor in 1908. In the 1920s he had been among the co-founders and one of the first professors teaching at the Hebrew University in Jerusalem. During the spring term 1933, he was subjected to a similar treatment as Schur: his beginners’ calculus class had to be delivered by his (Nazi) assistant Werner Weber, based on Landau’s notes. Only at the beginning of the winter term, on November 2, 1933, did Landau try again to lecture himself; he was promptly stopped by a well-organized boycott, led by the extremely gifted young student Oswald Teichmüller, a militant member of the party and the SA, whose mathematical talent was matched only by his political fanaticism. Upon Landau’s request, Teichmüller wrote up the “reasons” for this



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boycott in an abominable letter to Landau which mixes a peculiar deference with sarcastic insults. The basic “reason” given by Teichmüller for the boycott was the alleged racial incompatibility between teacher and students: the attempt on the part of the student to adopt a presentation of calculus by a “teacher of a different race” would lead, Teichmüller claimed, to “intellectual degeneration” [7]. As a consequence of this boycott, Landau resigned from his chair, gave up his house in Göttingen, and moved to Berlin where he died on 19 February 1938. His last years were gloomy, illuminated only by a few mathematical trips to Holland and England.

Shortly after the Landau boycott, the Berlin mathematician Ludwig Bieberbach echoed Teichmüller’s letter, and congratulated publicly the Göttingen students for their “manly” action against Landau – an action which he portrayed at the same time as a kind of biological necessity. During that winter term of 1933/34, Bieberbach was teaching a course entitled “Great German mathematicians, a race-theoretic approach” where he supposedly explained what was subsequently published in three papers: a classification of styles of mathematical production based on E.R. Jaensch’s psychological typology of apperception (which was popular at the time, and was itself not originally based on racial ideas, although Jaensch joined the new trend later in the 1930s). This pseudo-scientific theory went well beyond a simple separation of “Aryan” from “Jewish” mathematics, but contained finer distinctions which of course brought inevitable problems of fitting certain



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mathematicians into the right slot – Hilbert, for instance, was notoriously hard to accommodate in Bieberbach's theory.

It is one thing to reflect, as Bieberbach did, for instance on the relative pedagogical merit of different ways to introduce π in a calculus class: geometrically via the circle, or in Landau's way via the zeroes of the cosine, with this function being defined by its power series. And it is quite a different matter to use such reflections as a basis for advocating the forced removal of a distinguished colleague from teaching. Bieberbach's behaviour came all the more as a shock as nothing in his previous biography seemed to prepare one for it: Not only was he respected as a serious and deep mathematician (his work in geometric function theory actually continued to orient research well beyond his death), but no one had ever observed antisemitic tendencies in Bieberbach before the summer of 1933. He collaborated very well with Issai Schur for more than a decade; they even had a joint publication in 1928; but in 1935 it was Bieberbach more than anybody else who pushed Schur into early retirement. Bieberbach backed Remak's second attempt to get his *Habilitation* in 1923, against distinguished colleagues such as Max Planck. With Landau himself, Bieberbach had a mathematical correspondence soon after World War I, when Landau was going through a paper of Bieberbach's in a Göttingen seminar. In this correspondence, Bieberbach shows respect and admiration for Landau far beyond usual formulas of politeness. (The two halves of the correspondence are kept today at the Hebrew University in Jerusalem, resp. the

Göttingen Archives.) As far as his politics was concerned, Bieberbach was generally considered a loyal republican during the Weimar Republic – which made him an exception within the caste of German university professors who tended in general to cultivate monarchist ideals.

Yet there are elements of continuity in Bieberbach's attitudes, across the 1920s and 1930s: his vanity and love for honorary posts on the personal side, and his point of view on "nationalism vs. internationalism" in mathematics (as he himself put it in 1934) in the domain of mathematics policy.

His vanity was nicely recorded by Albert Einstein in 1919: "Herrn Bieberbach's love and admiration for himself and his muse is most delightful," he wrote to Born. In 1933, Bieberbach – who had been unfit for service in World War I – took part in a big SA march from Potsdam to Berlin, along with his four sons. As for honorary posts, in 1933 Bieberbach had already been for several years the secretary of the German Mathematical Association DMV, and the editor of the *Jahrbuch über die Fortschritte in der Mathematik*, a review journal which was rivalled since 1930/31 by the newly founded *Zentralblatt*. As of late 1933, he quickly became the leading figure of a group of mathematicians that I will simply call the "NS-mathematicians." Most of them were storm troopers, i.e., members of the SA. Inspired by the concept of national-socialism as a sort of cultural revolution, their goal was to somehow introduce Nazi politics right into mathematical life in Germany. Concretely, this meant that political criteria could override mathematical quality judgements at the institutes controlled by NS-mathematicians – we will see what this meant for the Berlin Institute below. The NS-mathematicians led by Bieberbach tried to gain control of the German Mathematical Association in September 1934, but this attempt had definitely failed by January 1935. After this, Berlin became the central refuge for the more visible NS-mathematicians, in particular from Göttingen: Oswald Teichmüller, Erhard Tornier, and Werner Weber; and also Harald Geppert from Gießen. Only Udo Wegner, a former student of Courant's, managed to run himself a similarly politicized institute, in Heidelberg as of 1937.

The continuity of these political battles with those of the 1920s does not reside in the precise ideological content – at least Bieberbach discovered Nazi slogans for himself only in 1933. But it comes out clearly when one compares the front lines of the thirties to those of the twenties, in particular around the big public controversy concerning the participation of German mathematicians at the 1928 ICM in Bologna. This was the first ICM to which German mathematicians were again invited, i.e., it marked the end of the post-World War I anti-German boycott at this level. Still, the question of whether one should actually follow this invitation generated strong emotions, with the feelings against participating fueled by a national pride which had been frustrated for a long time. Finally, Hilbert led a delegation of 76 mathematicians to Bologna (the biggest national group at this congress), but none of the Berliners went along. The opposition to Hilbert (whose opinion was shared by most mathematicians at Göttingen) was led by the Germanophile Dutch topologist L.E.J. Brouwer and by Bieberbach. Thus three



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basic conflicts merged in this controversy: the question of how much openness to international mathematical relations was adequate for German mathematicians, after years of postwar isolation and ill feelings; the longstanding rivalry between Berlin and Göttingen; and the debate about intuitionism vs. formalism, which Bieberbach could share in, on Brouwer's side, thanks to his predilection for the geometric approach over the algebraic one, and his emphasis of the role of intuition in mathematics. In this perspective, Bieberbach's sudden conversion to Naziism appears as the attempt to replay the old battle, taking advantage of the new distribution of power in Germany.

If such was Bieberbach's plan, he probably misjudged the real balance of power. Ever since the so-called *Röhm-Putsch* (30 June–2 July 1934), i.e., the assassination of 85 SA leaders upon Hitler's command, it became increasingly clear that the new regime had no intention to let Nazi "revolutionaries" do things their way. So without official backing, things were going to be difficult for Bieberbach. Such a backing in mathematics policy would most naturally have to come from the Ministry of Education, or possibly the Academy. For a while it did look like Bieberbach would get all the support he wanted from Theodor Vahlen.

The Greifswald mathematician Theodor Vahlen had been a Nazi activist from as early on as the winter of 1923/24 – see [11], [12]. In 1924, he was *Prorektor* of Greifswald University, and on the anniversary of the (Weimar) constitution that year he ordered the republican flag to be taken down. For once, the Weimar re-

public reacted strongly, and Vahlen was dismissed from his professorship (without pension rights) in 1927, in spite of numerous solidarity appeals. It was only in 1930 that he found again a position: at the Technical University in Vienna. When the Nazis came to power, he was given back his Greifswald position with great pomp. But he did not stay there:

In 1934, Vahlen became the successor of Richard v. Mises as head of the Berlin Institute for Applied Mathematics. And a few months later he accepted a high-ranking position at the Ministry. Probably upon Vahlen's recommendation, the applied institute was then taken over by the astronomer Alfred Klose who soon reduced it to a negligible quantity.

Once installed as what appeared to many colleagues to be the official Nazi mathematician at the Ministry, Vahlen was thought to back Bieberbach's campaigns. In fact, Bieberbach and Vahlen founded a new journal: *Deutsche Mathematik*, which published (in neatly separated categories) high-level research papers (for instance, many of Teichmüller's works) along with explicitly ideological pamphlets. The journal appeared from 1936 through 1943.

But the Ministry was not reduced to Vahlen, and people there seem to have felt the need for an internationally respectable Mathematical Association, which debates over the Aryan way of introducing π were not promising to create. Thus Bieberbach's influence on the nationwide scale, as well as the funding of *Deutsche Mathematik*, dwindled as time went on, and the Berlin Mathematics Institute became the only true sphere of influence where he could operate freely. It is instructive to see how he acted there.

If one tries to grade all mathematics departments in Hitler's Germany according to how strongly politicized they were, Bieberbach's institute in Berlin and Wegner's in Heidelberg are probably the worst cases. We shall give some concrete examples of what we mean. Before doing so, however, one should point out that such a grading does not mean that Nazi influence at other places was negligible or harmless. It just took a different form, and the variation was quite impressive. In fact, concentrating on Bieberbach too much can divert attention from and even exculpate others by comparison who had not been *like him*, or had even been explicitly against him in the controversy about the DMV.

To take an example, in Berlin there was the assistant K. Molsen who submitted a *Habilitationsschrift* in number theory which Bieberbach and Werner Weber were ready to accept in view of the political qualities of the candidate. It took Erhard Schmidt's intervention to stop this procedure. This certainly shows a failure of responsible action on Bieberbach's part. But on this account he is hardly worse than many others. Helmut Hasse in Göttingen, for instance, tried to propose the *Habilitation* of his assistant Paul Ziegenbein, even though the work was clearly not sufficient. Here, the plan was duly stopped by Carl Ludwig Siegel and Gustav Herglotz.

But there were other things happening in Berlin: not only did Bieberbach propose to the Ministry in 1935 to make Schur an emeritus, but he subsequently asked for Schur's chair to be suppressed completely, giving as a reason that Werner

Weber's lectures ensured adequate teaching in algebra. Given Werner Weber's modest mathematical qualities, this claim is preposterous – unless one reads it as an indirect expression of Bieberbach's contempt for this side of mathematical education.

As mentioned before, Oswald Teichmüller came to Bieberbach's institute for political reasons, thus offering Berlin the presence of the biggest young talent of his generation. It is likely that Teichmüller's switch from algebra (which he had done in Göttingen under Hasse's guidance and in close contact with Ernst Witt) to quasiconformal mappings and then "Teichmüller theory," was also motivated by ideological considerations. But Teichmüller never held a position at the institute; he lived on a modest stipend. This might be explained by Teichmüller's young age, his abrasive personality and extreme working habits, which may have advised against giving him a position involving everyday chores. Still, despite their Nazi affinities, Bieberbach did not succeed in actually integrating Teichmüller into institute life the way he had been involved in seminars at Göttingen. In what almost appears as a conscious suicide, he volunteered in 1943 to the crumbling Eastern front (although they had found a secure job for him in deciphering at Berlin) where he apparently perished sometime in September that year.

Another NS-mathematician from Göttingen, Erhard Tornier, who had previously contributed to foundational problems of mathematical probability, soon developed such an extravagant lifestyle, and ran up corresponding debts, in the capital that he lost both his professorship (it was in fact Landau's chair, which had been transferred for Tornier from Göttingen to Berlin) and his party membership before the war. This gave him the possibility to claim after the war that he had "turned away" from the Nazis early on.

It was also apparently for political reasons that Bieberbach brought to Berlin the Austrian set theorist Foradori as a lecturer. Or at least, if this move had mathematical motives, this would imply a lack of mathematical judgement which is difficult to attribute to Bieberbach.

It also seems characteristic of Bieberbach's handling of things that a number of very talented young mathematicians – like Collatz, Grunsky, Rinow, and Wielandt – were not given regular positions at the institute. Some of them were working for the *Jahrbuch Fortschritte der Mathematik* which Bieberbach continued to edit on behalf of the Berlin Academy.

There is another shameful aspect to the history of the mathematical community in the Third Reich which is immediately connected to Berlin, although not to Bieberbach's institute: the role of the *Reichsverband Mathematik*, which was directed ever since its foundation in 1921 by Georg Hamel from the Technical University Berlin – see [2]. It had been created as a kind of public relations agency for the mathematicians in relation to governments. Consequently, as of 1933, Hamel smoothly switched to Nazi rhetoric, insisting for instance on an alleged *Geistesverbundenheit der Mathematik mit dem Dritten Reich* (spiritual bond between mathematics and the Third Reich) [1], p. 309. But it is not for such rhetorics that

the role of Hamel's *Reichsverband* constitutes such a dark chapter in the history of mathematics – a chapter, incidentally, of which research mathematicians at the universities hardly took notice. What the *Reichsverband* did among other things was, in fact, to draw up model exercises for schoolbooks, like these [2]:

Exercise 85. In the German Reich the population density per 1 km² of territory is 140 inhabitants, in Poland 80, South-East-Europe 48, North-East-Europe 32, Soviet Russia 8. – Represent these by five squares of which a part corresponding to the population is shaded.

Exercise 95. The construction of a mental asylum cost 6 million Reichsmark. How many residential houses of 15000 RM each could have been built from this money.

We conclude this chapter by mentioning a few aspects that we have not gone into:

- the decreasing number of mathematics students, and the politization of student life – see the remarks in [6], section 3, and references given there;
- the effect of Nazi politics on mathematical review journals – see [15];
- the role of various government organizations for mathematics and mathematicians in Berlin like the Ministry of Education, the *Deutsche Forschungsgemeinschaft*, etc. – see [12], also [15];
- the war research groups centralized in Berlin – see [3] for a first survey of applied mathematics under Hitler; more historical research on this is desirable.

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