

Some basic biographical facts about Emmy Noether
(1882-1935), in particular on the discrimination
against her as a woman

LMS-IMA Joint Meeting:

Noether Celebration

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ABSTRACT

Although it has been repeatedly underlined that Emmy Noether had to face threefold discrimination in political, racist and sexist respects the last-mentioned discrimination of the three is probably best documented. The talk provides some basic biographical facts about Emmy Noether with an emphasis on the discrimination against her as a woman, culminating for the first time in the struggles about her teaching permit (habilitation) 1915-1919 (main source C. Tollmien). Another focus of the talk will be on the later period of her life, in particular the failed appointment in Kiel (1928), her dismissal as a Jew in 1933 and her last years in the U.S.



Abb. 23 Emmy Noether, 23. 3. 1882 – 14. 4. 1935

**Born: 23 March 1882 in Erlangen,
Bavaria, Germany
Died: 14 April 1935 in Bryn Mawr,
Pennsylvania, USA**

Older sources

Obituaries by colleagues and students:

van der Waerden, Hermann Weyl, P.S. Aleksandrov.

Historians:

Three women: Auguste Dick (1970, Engl.1981), Constance Reid (*Hilbert* 1970), and Cordula Tollmien (e.g. 1991 on Noether's Habilitation); **plus** Norbert Schappacher (1987).

Most material in German, Clark Kimberling (1972) in *American Mathematical Monthly* mostly translating from Dick and obituaries.

Emmy Noether
1882-1935

Auguste Dick
Translated by H.I. Blocher

1981
Birkhäuser
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Die Habilitation von Emmy Noether an der Universität Göttingen*

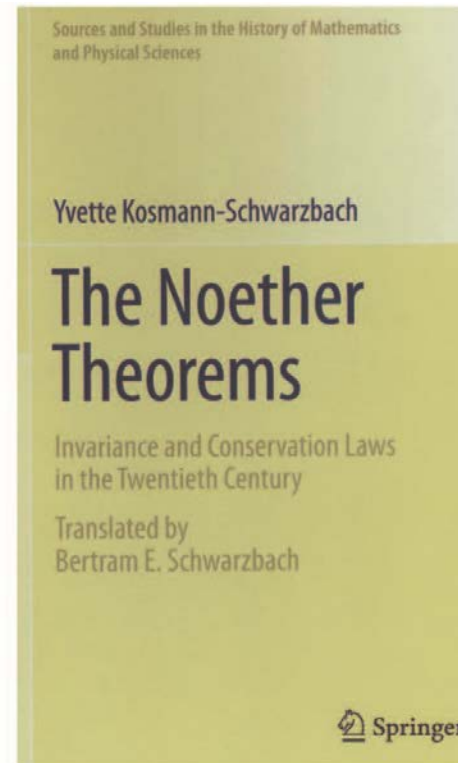
Von CORDULA TOLLMIEN (Hann. Münden)

Emmy Noether war die erste Frau, die an der Universität Göttingen habilitiert wurde. Ihre Habilitation fand im Juni 1919 statt, und sie gehörte damit zu den wenigen Frauen in Deutschland, die schon 1918/19 (nachdem sich die Universitäten und zuständigen Entscheidungsträger in den Ministerien während des Kaiserreiches erfolgreich dagegen gewehrt hatten) die Möglichkeit erhielten, sich zu habilitieren, obwohl den Frauen dieses Recht offiziell erst im Februar 1920 zugestanden wurde. Das 1919 abgeschlossene Habilitations-

Newer Sources

Again mostly by women biographers, such as Renate Tobies (2003), Cordula Tollmien (2015), and Mechthild Koreuber (2015).

The book below, of which the English version is from 2011, discusses the papers relevant for physics:



Yvette Kosmann-Schwarzbach



After going through a girls school she took in 1900 a state exam to become a teacher in English and French at Bavarian girls schools. This was EN's strategy to document enough academic merits in order to be exceptionally allowed to sit in at university (for mathematics). Only secondary was the motive that it should enable her to earn her livelihood, should the need ever arise. (Tollmien 2016)

In 1907 Emmy Noether was granted a doctorate after working under Paul Gordan. Having completed her doctorate the normal progression to an academic post would have been the Habilitation (teaching permit). However this route was not open to women under the monarchy, so Noether remained at Erlangen, helping her father.

There she was influenced by Ernst Fischer who had succeeded Gordan to the chair of mathematics when he retired in 1911. Noether wrote about Fischer:

“Above all I am indebted to Mr E Fischer from whom I received the decisive impulse to study abstract algebra from an arithmetical viewpoint, and this remained the governing idea for all my later work.”



Ernst Fischer. (Courtesy of Ursula Fischer.)

Ernst Fischer (1875-1954)
of Riesz-Fischer Theorem
(1907) fame

In the spring 1915 Hilbert and Klein, the leading mathematicians in Göttingen, **invited Noether** from Erlangen to help them in their work on mathematical physics, in particular about the mathematical aspects of Einstein's general theory of relativity. They decided they needed the help of an expert in invariant theory. But they soon realized the need to offer something to Emmy Noether in return for her help.

So they tried to seek an exception from the ministry which had so far banned the awarding of "Habilitation" to women. In their effort, the mathematicians had to cope with conservative members of the large Philosophical Faculty (which comprised historians and philosophers, as well as scientists) and who were, of course, not immediately interested.



Felix Klein (1849-1925)
Famous painting by Max Liebermann
1912

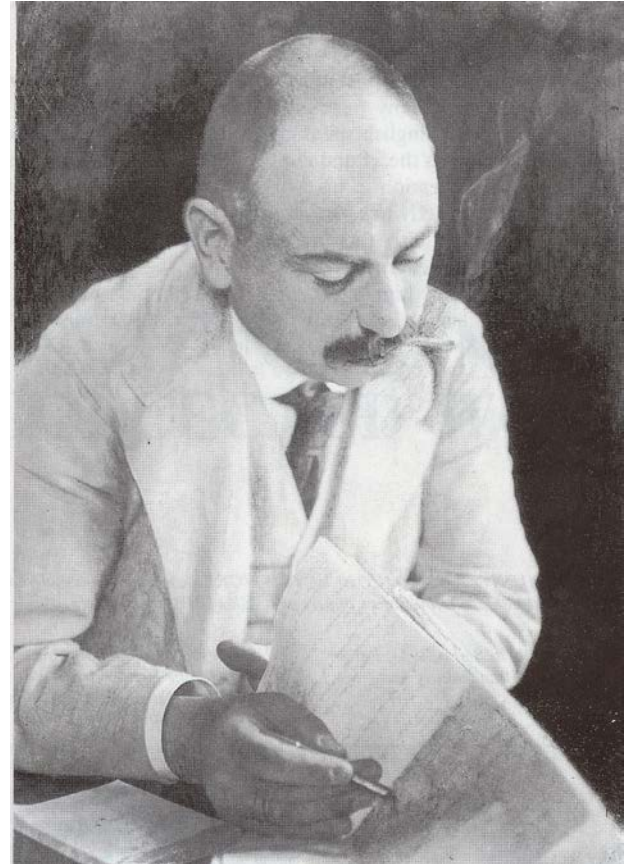
Felix Klein said in an opinion 28 July 1915

“In spite of all reservations one might have against the Habilitation of a lady” one should make an exception for Noether, because of her “extraordinary talent.”

He also said that this would be “well in our own interest”.

An impression of the resentment at the time, even among mathematicians, is given by the following opinion uttered by the Göttingen number theorist **Edmund Landau** (1 August 1915):

“As to productive results of female students I have so far had only the worst experiences. I deem the female brain incapable of mathematical production. Miss Noether, however, I consider one of the rare exceptions.”





Hilbert 1862 - 1943

David Hilbert was the only mathematician who did not subscribe to the rule that women were in general unfit to do mathematics, and he ran into some verbal arguments about this within the faculty.

In this connection the following anecdote appeared (first in C. Reid) which has since been repeated all over the place in the biographical literature on Noether, although no documentation to support it has so far been found.

Hilbert allegedly said to some conservative colleagues:

"I do not see that the sex of the candidate is an argument against her admission as Privatdozent. After all, **we are a university, not a bathing establishment.**"

An impression of the resistance is given in the letter of the **dissenting minority** from 19 November 1915:

“All members of the Faculty - even those of the majority vote – agree that only in exceptional cases a female brain can produce creative scientific results. But above all a woman is not at all suited for uninterrupted teaching, due to the phenomena [Erscheinungen] connected with the female organism.”

The special political conditions of the ongoing war are used as an argument by one faculty member, whose dissent was even stronger, although he was from the science division (astronomer **Johannes Hartmann**):

“Our private docents who **return from the front [Feld]** after having sacrificed their health for the fatherland, would welcome with very mixed feelings such competition grown during their absence.”

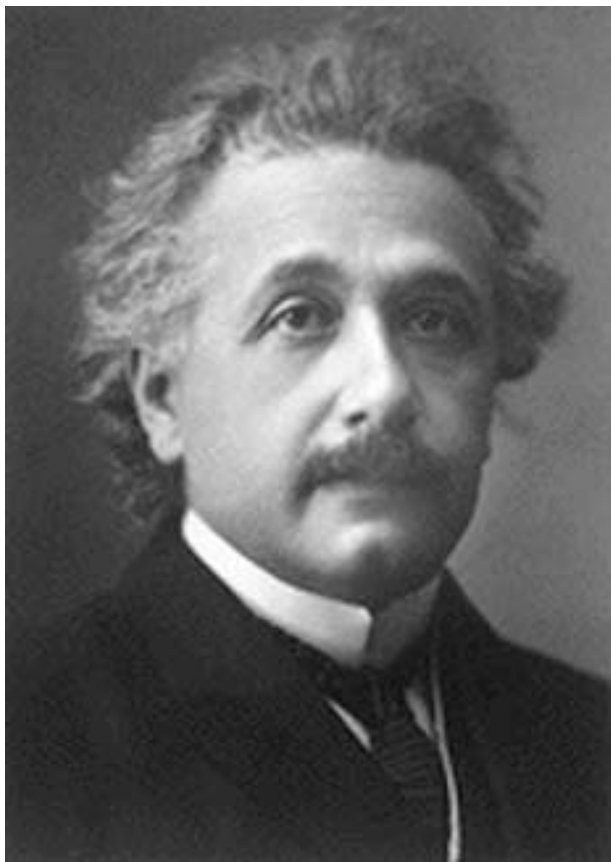
Finally, on **26 November 1915**, the **majority** of the Faculty supported the application to the ministry of:

“The Minority vote is exclusively based on a categoric resentment against the admission of women. Nobody denies the opinion of the mathematicians: Miss **Noether**’s accomplishments are **above the average of the private docents** who are so far admitted in Göttingen. We know that she won’t take jobs from docents returning from the front. ... Very important for our first attempt at the habilitation of a woman is also our private impression of her. We can rule out in her case everything previously observed in individual female representatives of scientific tendencies. She has been raised in the home of a scholar and will be a diligent and humble worker in her profession.”

Alas, all came to nothing during the monarchy, and only the end of the war brought the turn around of a modest kind for Emmy Noether.

But before, still during the war, a letter was written on May 24, 1918.

Einstein wrote to Hilbert:



"Yesterday I received from Miss Noether a very interesting paper on invariant forms. I am impressed that one can comprehend these matters from so general a viewpoint. It would not have done the **Old Guard** [Feldgrauen = the Fieldsgrey] at Göttingen any harm, had they picked up a thing or two from her. She certainly knows what she is doing."

(quoted in Kimberling "Emmy Noether" in *American Mathematical Monthly* 1972)

Mistranslation of “Feldgraue = Fieldsgrey” as “Old Guard”

The British-American physicist Freeman J. Dyson responded to this publication with a letter to Kimberling, stressing that “Feldgraue” is slang for “Warrior.” In fact the word refers to the soldiers returning from the front in their grey uniforms. It does not allude at all to the older mathematicians in Göttingen with their grey hair, as much as they might have been in need of a catch-up coaching by Emmy Noether.

It seems also psychologically very unlikely that Einstein would have written such things exactly in a letter to Hilbert.

Unfortunately, Kimberling, who published a correction in AMM in 1972, forgot about the error and repeated the mistranslation in 1981 in the collection on Emmy Noether by Brewer and Smith.

The result is that the mistranslation is repeated even today, for example in the book by Kosmann-Schwarzbach of 2011.

In reality, Einstein was alluding to the events around the failed attempt at Habilitation, in particular to the problem of returning soldiers. Einstein, who was in correspondence about Noether with both Hilbert and Klein, was informed about their efforts to provide Habilitation for Noether, and he supported them actively.

Moreover, Einstein's May 1918 letter to Hilbert was primarily devoted to joint efforts to damp the nationalistic mood among academics on all sides of the war factions. This leads me to the assumption that Einstein had more in mind with his allusion to the "Feldgrauen," a word, which has an ironic connotation anyway.

He apparently found that the warriors were in need of some feminine, peace-loving mood, instilled into them by someone like Emmy Noether. She was known for her pacifist views, as was Einstein himself.

Hermann Weyl (1935) on Emmy Noether's political engagement

“During the wild times after the Revolution of 1918, she did not keep aloof from the political excitement, **she sided more or less with the Social Democrats**; without being actually in party life she participated intensely in the discussion of the political and social problems of the day. One of her first pupils, Grete Hermann, belonged to Nelson's philosophic political circle in Göttingen. It is hardly imaginable nowadays how willing the young generation in Germany was at that time for a fresh start, to try to build up Germany, Europe, society in general, on the foundations of reason, humaneness, and justice.

But alas! the mood among the academic youth soon enough veered around; in the struggles that shook Germany during the following years and which took on the form of civil war here and there, we find them mostly on the side of the reactionary and nationalistic forces. Responsible for this above all was the **breaking by the Allies of the promise of Wilson's Fourteen Points**,...

In later years Emmy Noether took no part in matters political. She always remained, however, a **convinced pacifist**, a stand which she held very important and serious.”

Einstein's involvement in the efforts to provide Habilitation for Noether transpires from another letter, **shortly after the German defeat**, this time to **Felix Klein on 27 December 1918**:

“Having received Miss Noether’s most recent work I find it once again a **great injustice** that one does not grant her the teaching permit. I would be very much in favour of making an energetic intervention at the ministry. If you do not find this possible, I will try on my own.”

But contrary to Einstein’s fears, the mathematicians in Göttingen remained active in Noether’s case. The Mathematical-physical division of the Philosophical Faculty renewed their application on 15 February 1919 to the new ministry:

“The **changed political conditions**, which have led to a comprehensive enlargement of women’s’ rights give hope to the representatives of mathematics here in Göttingen that an application in this direction would now be successful.”

Short reflection on the bathing establishment anecdote connected to politics

Emmy Noether was an avid swimmer and there was a swimming culture among Göttingen mathematicians, including Hilbert, in the river Leine. Noether's friend, the Russian topologist P.S. Aleksandrov, met her and Hilbert there often in the 1920s. However, before the revolution of 1918 the swimming had been strictly compartmentalized between men and women, even in the university-owned part of the river.



Maybe Hilbert expressed in 1915 this personal experience of not being able to swim with his assistant Noether during that summer.

(The picture to the left is from the Baltic Sea in 1933. Noether in the background, her brother Fritz sitting in the middle, her nephew Hermann (?) in front.)

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(The picture to the left is from the Baltic Sea in 1933. Noether in the background, her brother Fritz sitting in the middle, her nephew Hermann (?) in front.)

Back to the Habilitation: The application was now granted, and Emmy Noether received her Habilitation and the status as Privatdozent in 1919, which, however did not carry any salary. From 1922 Noether would receive a meagre stipend until her emigration in 1933.

A striking and probably adequate evaluation of **Noether's didactic abilities** is contained in the petition addressed to the Ministry by the department of mathematics and natural sciences in 1922, requesting that Emmy Noether, now *Privatdozentin*, be given the official title of a "*ausserordentlicher Professor.*" It reads:

"Her renown as a scientist is indisputable . . . While **less well suited as instructor of large classes in elementary disciplines**, she is capable of exercising great scientific influence upon gifted students, many of whom she has furthered considerably, and some of whom have already achieved *Ordinariate.*" (Dick 1981, 40)

The latter remark seems to refer to W. Schmeidler (prof. Breslau 1921) who coauthored with Noether an important paper on module theory (1920).

The 1920s saw the breakthrough of Noether's structural algebra culminating for instance in van der Waerden's *Moderne Algebra* (1930), and the "Hauptsatz" in the theory of algebras of 1932 by Brauer, Hasse and Noether.

Die Struktur der R. Brauerschen Algebrenklassengruppe über einem algebraischen Zahlkörper.

Inbesondere Begründung der Theorie des Normenrestsymbols
und Herleitung des Reziprozitätsgesetzes mit nichtkommutativen
Hilfsmitteln.

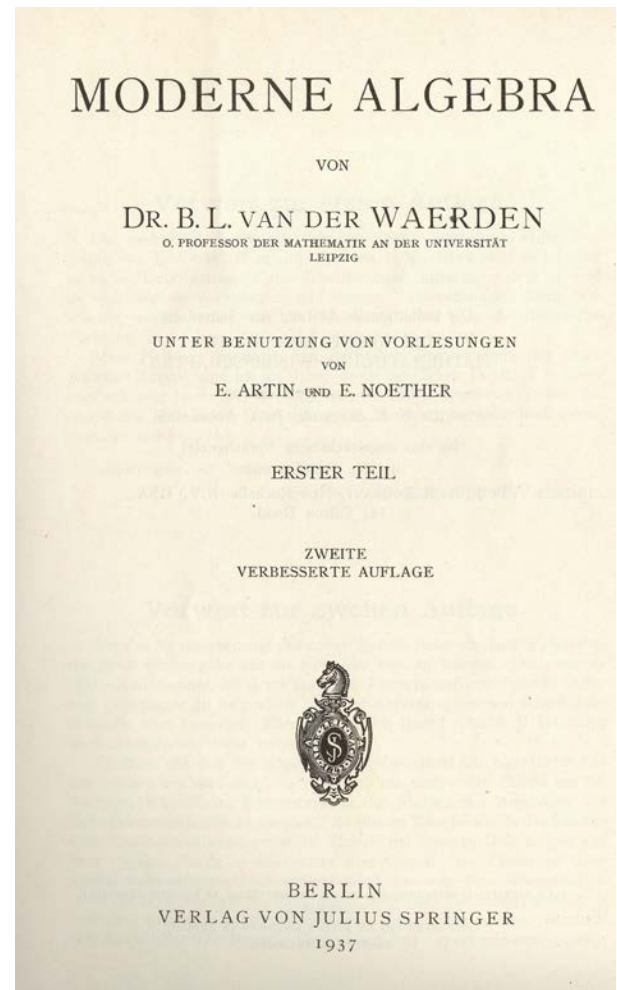
Emmy Noether zum 50. Geburtstag am 23. März 1932.

Von

Helmut Hasse in Marburg.

Einleitung.

Emmy Noether [4] hat wohl zuerst den Gedanken ausgesprochen, die Theorie der nichtkommutativen Algebren sei von einfacheren Gesetzmäßigkeiten beherrscht als die Theorie der kommutativen Algebren, insbesondere der kommutativen algebraischen Erweiterungskörper, und folgerichtig sei die nichtkommutative Theorie in einem systematischen Aufbau nicht nur rein äußerlich der kommutativen Theorie voranzustellen, sondern auch zu deren Begründung sachlich weitgehend heranzuziehen. Sie hat selbst die Durchführbarkeit dieses Gedankens für verschiedene Einzelabschnitte der Gesamtheorie dargetan, und zwar nicht nur für rein-algebraische Teile (Galoissche Theorie), sondern neuerdings auch für tiefliegende arithmetische Gedankenreihen (Hauptgeschlechtssatz).



Emmy Noether: “The Experiment to Promote a Woman to a Full Professorship”

REINHARD SIEGMUND-SCHULTZE

The article, which is a translation of [11], investigates the arguments used by Noether’s colleagues Adolf Fraenkel and Helmut Hasse to rule out Noether’s possible appointment to Kiel in 1928. Apart from partly justified but nevertheless hypocritical doubts about Noether’s suitability for elementary teaching, one finds a feeling of inferiority from Fraenkel and a general resentment against women in academia from Hasse.

From the
*Newsletter
of the LMS*
May 2018



Left: Ernst Steinitz (Bildarchiv des Mathematischen Forschungsinstituts Oberwolfach/Archives Peter Roquette). Middle: Adolf Fraenkel (The David B. Keidan Collection of Digital Images from the Central Zionist Archives). Right: Helmut Hasse (standing) and Emil Artin (Bildarchiv Mathematisches Forschungsinstitut Oberwolfach/Archives Peter Roquette)

Fraenkel to Hasse, 8 October 1928:

“Miss Noether. There is no doubt that as a man she would have received a call a long time ago and that she would be successful in Kiel as a researcher, although she has but little talent for elementary teaching.

Personally I imagine a collaboration with her quite unpleasant [unerquicklich]. This would not be relevant if utterances from herself (seriously meant?) and from others had not represented it as such . . . that she much prefers her huge influence in Göttingen over a professorship at a small university with only few students. Is it justified — as I actually would prefer — not to put her on the list?”

Hasse to Fraenkel, 10 October 1928:

“Miss Noether: I am astonished that you even seriously consider this possibility. Although I regard her highly in scientific matters I deem her totally unfit to fill a regular teaching position, even less so at a small university like Kiel, where there is only one besides her who could improve what she has spoiled. She fits only in a university where she is never obliged to give main and introductory courses, i.e. on a big scale such as Göttingen etc. I am, in addition, of the opinion that **one should not make the experiment to promote a woman to a full professorship** at such a solid place as Kiel. This experiment should be tried on a bigger scale where an unsuccessful outcome would not do so much harm.”

Noether's dismissal by the Nazis in 1933

On May 10, 1933 she writes to Helmut Hasse:

“Many thanks for your dear, compassionate [freundschaftlich: amicable] letter! I must say, though, that this thing is much less terrible for me than it is for many others. At least I have a small inheritance (I never was entitled to a pension, anyway) which allows me to sit back for a while and see.” (Dick 1981, 47)

On 21 July 1933 she writes again to Hasse:

“I have put my social democratic party membership until 1924 on paper, by the way I have never voted further to the left.”

A Nazi friendly functionary at the university in Göttingen commented in August 1933:

“In political respect in my opinion Miss Noether has been on Marxist [Social Democratic] ground from the Revolution of 1918 until today. Even though I find it possible that her political conviction was more of the theoretical kind rather than with practical conclusions, I still suspect that one cannot expect from her unconditional support for the national state.” (Schappacher 1987, 351)

On 2 September 1933 the Nazis cancelled her teaching permit on grounds of the “Aryan paragraph” of the law from 7 April 1933.

We know that Noether received a one-year stipend (provided by philanthropy) as guest professor at the Women's College **Bryn Mawr** in Philadelphia, which she occasionally called "**Weiberuniversität**" using half in jest the derogative German word "Weib" for "woman."

On 6 March 1934 Noether writes to Hasse from Bryn Mawr:

"Since February I have a weekly lecture in **Princeton** – at the Institute not at the 'Men's' university which **does not know anything female.**"

19 March 1934 she writes from Bryn Mawr to Aleksandrov in Moscow:

"My three girls study van der Waerden enthusiastically, an enthusiasm which stretches as far as solving all exercises. This is a typically female thing which I find rather frightening."

Noether seems to have felt relatively OK in the U.S., and was satisfied that her English was sufficient (maybe a profit from her teacher's licence of 34 years ago).

Noether even damped Aleksandrov's efforts to provide a professorship for her in Moscow, alluding in a letter to efforts on her behalf by the Institute for Advanced Study (IAS) in Princeton:

“Until autumn 1935 I am still engaged here [at Bryn Mawr] and for the time afterwards the people in Princeton have told me to stay, in which form, whether still commuting or moving, they probably do not know yet by themselves.” (Tobies 2003, 106/7)

Thus had Noether lived longer, the great Hermann Weyl (1885-1955), Hilbert's successor in Göttingen, who was now a leading figure at the IAS, would have had a chance to relieve his conscience a bit. He said about Emmy Noether in his obituary of 1935:

“I was ashamed to occupy such a preferred position beside her whom I knew to be my superior as a mathematician in many respects.”

However, in spite of the relative safety for Noether in American exile, one should not underestimate her longing for Göttingen and for the family, in particular her brother Fritz and her nephew Gottfried.

Einstein's obituary of Emmy Noether in "New York Times" 4 May 1935

Flexner's translation of the final passage:

"She found in America up to the day of her death not only colleagues who esteemed her friendship but grateful pupils whose enthusiasm made her last years **the happiest and perhaps the most fruitful of her entire career.**"

Einstein's original German:

„Einsichtige Freunde der Wissenschaft sorgten in diesem Lande dafür, dass sie in einem Kreise freundlicher Kollegen und dankbarer Schüler bis zu ihrem Tode wirken konnte, der sie mitten in froher und fruchtbarer Arbeit ereilte.“

The English translation should be:

"Thoughtful friends of science in this country provided for her being able to work in a circle of friendly colleagues and grateful students, until death caught her in the midst of joyful and fruitful work."

Flexner's strong exaggeration "happiest and perhaps most fruitful of her career" instead of "joyful and fruitful work" is not only an expression of his self-interest as an American host, but also a disgrace to Einstein's real intentions as a necrologist.

Flexner's exaggeration is above all a gross underestimation of the sufferings of the refugee Emmy Noether, who might have hoped at the time to be allowed to return to Göttingen soon. There was actually still hope at the time among refugees that Hitler would disappear and everything would turn out or appear as a bad dream.

Indeed Olga Taussky (in Brewer/Smith) reported about "a considerable number of troubles on her mind" in Princeton and said "Emmy was not in the best mood". Richard Brauer wrote to Weyl after her death that she was homesick for Göttingen although she did not feel too bad altogether in the U.S.

Probably one can assume the following mood for Emmy Noether, which I found typical of refugees in the U.S. in the 1930s

"We are happy here, but not glücklich."

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