Arch Gynecol Obstet (2005) 272: 245–260
DOI 10.1007/s00404-005-0046-6

REVIEW

Udo Rudloff · Hans Ludwig

Jewish gynecologists in Germany in the first half of the twentieth century

Received: 4 April 2005 / Accepted: 14 April 2005 / Published online: 7 August 2005

Abstract The political changes in Germany of 1933 led to discrimination, expulsion and emigration of Jewish doctors. This article addresses the memory of gynecologists who were eminent physicians or made fundamental discoveries. Short biographies of Ludwig Fraenkel, Selmar Aschheim, Bernhard Zondek, Ludwig Adler, Robert Meyer and Paul Ferdinand Strassmann highlight their work and their links to the Gynecological Society in Berlin and to the German Society of Gynecology, the foundation of the latter being inspired by Wilhelm Alexander Freund from Strasbourg.

Introduction

Jewish involvement in medicine rose to great heights with two peaks of achievement—a German over the latter half of the nineteenth century and an American after 1930, both associated with significant medical discoveries. Recent research has shifted from documenting the disrupted personal and professional lives of distinguished German/Austrian physicians dismissed from academic and institutional positions because of their Jewish identity and lineage to elucidating the fate of this professional group under National Socialism. The emigration of Jewish physicians from Germany, and the historical and sociological background which led to their departure, has recently attracted attention in several communications. With the exception of pediatrics, however, no detailed description of the fate of Jewish specialists, including gynecologists, exists.

The rise of Jewish involvement in German medicine in the second half of the nineteenth century shows that Jewish physicians were restricted to fields not attractive to their gentile colleagues, e.g., basic sciences, dermatology, psychiatrics, pediatrics, neurology, and venereology. Pre-Hitler anti-Semitism prevented Jews from entering classic specialities like internal medicine and surgery, and kept them out of the inner corridors of power. A different situation existed in the 'Gesellschaft für Geburtshilfe und Gynäkologie zu Berlin' und the 'Deutsche Gesellschaft für Gynäkologie und Geburtshilfe' when allowed Jewish gynecologists to use these forums as a platform for their discoveries and accomplishments and, also elected them to presidency of these societies. Only the political changes of 1933 led to the process of discrimination, expulsion, and emigration, often affecting personalities who made fundamental discoveries or who founded entire new specialities. Eight biographies of distinguished, eminent Jewish gynecologists are presented in our review and they portray the blindness of a policy of human and cultural purging [35]. The self-inflicted diminution of medical expertise meant a substantial loss to all postwar German medical societies while the health systems of other countries were enriched by Jewish physicians who escaped from Germany's temporary departure from being a civilized society.

The authors are indebted to Frank E. Loeffler, MD, FRCOG, Aldeburgh (Suffolk, UK), for his critical review of the manuscript and for his advice.

U. Rudloff
Department of Surgery, North Shore University Hospital, Manhasset, NY, USA

H. Ludwig (✉)
Department of Obstetrics and Gynecology, University of Basel, Wartenbergstrasse 9, 4052 Basel, Switzerland
E-mail: prof.ludwig@bluewin.ch
Tel.: +41-61-3129510
Fax: +41-61-3129514

At the turn of the nineteenth–twentieth century

The entrance of Jews into academic medicine was characterized by significant regional differences in Germany before 1870/1871 [37]. While a few universities like the Academia Fridericina Halensis (University of Halle) and the Frankfurt Viadriana (University of Frankfurt/Oder) admitted Jews to the full curriculum of studies of

medicine, at most other German universities, religious resentments precluded Jewish people from the study of medicine [36, 37, 39]. Formally, the emancipation of Jews had been established with the Hardenberg'sche Reform in 1815 under the guidance of Wilhelm von Humboldt, claiming full civil rights for the Jewish minority [22]. However, it was not until 1860 that most universities reluctantly admitted Jewish students [38]. The equality between Jewish and German graduates, however, ended usually shortly after the doctorate or the Venia practicandi. A career progression towards professorship in governmental service or governmental university institutions was excluded for non-baptized physicians [38]. These restrictions on higher career opportunities were never fully lifted until the beginning of the Weimar Republic [37]. Even then, latent anti-Semitism prohibited appointment to ordinary professorships, so that a classic Jewish career usually ended as extraordinary professor or university docent, acting as departmental director or, occasionally, as director of a clinic. Shulamit Volkov hypothesized in 1987 that latent anti-Semitism actually helped the success of Jews and Jewish scientists [72]. They were forced into unfashionable specialities because they were in their infancy at that time. For example, the majority of the few ordinary professors of Jewish descent were not appointed to the faculties of internal medicine or surgery, but to newly evolving smaller disciplines like neurology, dermatology, psychiatrics, pharmacology, or physiological biochemistry [46]. The same applied to the academic institution: Jewish professors with full-faculty appointment could not be found at the traditional universities of Heidelberg or Berlin, but existed at medical faculties of the universities of Breslau, Strasbourg, or Frankfurt [46]. Academic careers for a Jewish scientist were offered by the non-university research institutions like the 'Kaiser-Wilhelm-Institute'. There, advances of the nineteenth century opened up new specialties which were looking for researchers. The best example hereto is biochemistry which had a disproportionate number of Jewish scientists, and with Otto Meyerhof, Carl Neuberg, and Otto Warburg, its most distinguished representatives, who either shared the Nobel Prize or made significant contributions while in exile [46, 68].

It is now accepted that despite the opening of German universities to the Jews in the 1860s, they were restricted to fields not attractive to their German colleagues. They pioneered new specialties when the latter were still in their infancies [14]. This unique period of Jewish medicine in Germany included the immunologists Ehrlich and Wassermann, the neurologist Romberg and Freud, the dermatologists von Hebra and Unna, the otologists Politzer and Bárány, another Nobel prize winner, and the pediatricians Henoch and Bagnicky. It was as if William Osler possessed clairvoyance, when 50 years earlier in a letter to the *Canadian Surgical Journal* in 1884, he reported his clairvoyant observations from Germany [11]:

The Modern "hep, hep, hep" shrieked in Berlin for some time past has by no means died out, and to judge from the tone of several of the papers devoted to the Jewish question, there are not wanting some who would gladly revert to the plan adopted on the Nile some thousands of years ago for solving the problem of the Semitic increase. Doubtless there were then, as now, noisy agitators—prototypes of the Parsons Stocker—who clamored for hard laws which ultimately prevailed, and for the taskmasters whose example so many gentile generations having willingly followed of demanding, where they safely could, bricks without straw from their Israelite brethren. Should another Moses arise and preach a Semitic exodus from Germany and should he prevail, they would leave the land impoverished far more than ancient Egypt by the loss of "jewels of gold and jewels of silver of which the people were spoiled" ... and .. there is not a profession that would suffer the serious loss of its most brilliant ornaments than our own ... the number of professors and docents of Hebrew extraction in the German Medical Faculties is very great and I know their positions have been won by hard and honorable work. I fear ... that the present agitation will help to make the attainment of university professorships difficult.

The Weimar Republic Jewish gynecologists and the rise of national socialism (Nazism).

Economic, social, and political changes in the aftermath of 1918 started to affect Jewish physicians. While Jewish scientists and academics were mostly able to resume their pre-war positions, Jewish clinicians faced fierce competition. At the beginning of the twentieth century, Jewish physicians comprised of 10% of the medical workforce in Germany [76]. Some of them had become very successful, like the gynecologist Paul Ferdinand Strassmann, who was the owner and director of the first Private Women's Clinic in Berlin. He was supported by his son, who was the chief of staff from 1926 to 1936 [22]. Overall, a unique symbiosis between Jewish physicians, half of the clinical practitioners in Berlin at that time, and the German population had started to form. Thus, for example, in 1933, about half of the beds of the Jewish Hospital in Berlin were occupied by non-Jewish patients [22, 44]. In the suburbs of Berlin, most clinical work was done by Jewish physicians. Their racial status often became known to their patients only after 1933 when they could not use their services any more.

After 1918, when 5,000 military doctors returned from the war, new medical school graduates and military veterans found themselves in a saturated job market and a devastated economy [69]. Reforms to save the collapsing sickness insurance system led to the inclusion of relatively affluent patients in the state-based funds. The

loss of these private patients as an additional income increased the dissatisfaction with the large, bureaucratic insurance companies [41]. In late 1923, the Socialist-controlled sickness insurance funds established a patient-to-doctor quota and limited physician admittance to the insurance-fund practice [45]. This created long waiting lists for young doctors applying to join the insurance system resulting in an increasing number of uninsured patients and in unemployment rates among physicians of greater than 10% [10]. The stock-market crash in the autumn of 1929, the subsequent depression with rocketing unemployment in 1930 was followed by bankruptcy of most insurance funds. The state had to impose a user fee of 50 Pfennig to patients supported by insurance funds. This mandatory contribution posed an unaffordable burden on the income of millions of families leading to a deterioration of the health situation as a whole and to a significant drop in doctor visits. The decreasing number of patients supported by the insurance funds caused substantial financial losses for the physicians. Physicians began intensifying their demands for reform of the insurance funds [82]. Many joined the nascent National Socialist Physicians' League, which was founded by a core of 50 doctors in 1929 [40].

In this climate of dwindling income, social insecurity and inefficient bureaucracy, the demonization of Jews by the National Socialist Party provided a convenient scapegoat for frustrated German physicians. The proportion of Jews in medicine exceeded their representation in the German population by a factor of 10 [10, 46]. In cities such as Berlin, over 50% of physicians were Jewish as a result of their migration to the big cities [69] . German–Jewish physicians were often active as teachers or public health counselors in the Weimar period. Due to their involvement in Socialist party councils and union organizations, they played a key role in the administration of the hated health-insurance companies [45]. Consequently, non-Jewish physicians were blaming the fierce competition for their medical jobs on the supposed Jewish monopolization of medicine [44, 70]. These resentments were fuelled and exploited by increasingly confrontational propaganda of the National Socialist Physicians' League which, by 1930, had developed into a platform calling for the removal of Jews from medicine and the abolition of insurance control [41]. By 1933, membership had risen to 2,786, a tenth of the profession [82]. With the rise of National Socialism in early 1933, the League was ready for take over. It served as an organization devoted to Nazi-doctrine immediately after take over of power—a pivotal role in the process of 'Gleichschaltung' which meant unification of the medical system under National Socialism. By August 1933, the consolidation of Germany's medical insurance organizations into one 'Association of German Health Insurance Physicians' Organization' (Kassenärztliche Vereinigung Deutschland—KVD) had been approved. Sickness funds and health insurance companies of worker unions or Socialist parties were either incorporated under National Socialist rulers into the new system or abolished with political prosecution and repression of its members. Overall, the creation of the centralized KVD facilitated the smooth transfer of payments from the sickness funds to doctors. This, together with the end of the depression, resulted in a significant increase in patient's visits and income for doctors [40].

The 'Gleichschaltung' of medicine was deepened by passing of the Law for Unification of Health Affairs in 1934, which delegated the administration of public health to the National Socialist rulers. Centralized bodies for health under National Socialist governments were established in every province [69, 82]. By politically unifying German medicine quickly and relatively quietly, the National Socialists were able to control medical certification, education, and research with little opposition.

The Exodus of Jewish Physicians: a balance of suppression and expulsion

Until 1933, both medical and scientific societies were not affected by the right-shift of German politics and the rise of National Socialism [37]. Thus, the admission lists of the Leopoldina society, the most distinguished scientific organization in Germany at that time, included several Jewish Nobel prize winners like Robert Báranay (1876–1936), Fritz Haber (1868–1934), Karl Landsteiner (1868–1943), and Gustav Hertz (1887–1975) [37]. For most medical societies, until the early 1930s, race and religion were mainly ignored. Up to this point, Jewish physicians occupied many leading positions.

In June 1933, 51,527 physicians, of which 5,557 being of Jewish descent, were registered within the Third Reich [76]. The proportion of Jewish doctors, however, has to be estimated as higher as Jewish physicians had left Germany already before 1933. In 1933, Jews were only classified as such when they practised their religion ('Glaubensjuden'). In later years, Jews were classified as "half" or "full" Jews depending on the parental or grandparental descent. Thus, Kümmel estimated that in early 1933, 15–18% were non-Aryan, making their number 8,000–9,000 [47]. Since many Jewish physicians were members of political organizations attached to left and socialist parties, like the Association of Socialist Physicians ('Verein sozialistischer Ärzte') or the Association of Social democratic Physicians ('Arbeitsgemeinschaft sozialdemokratischer Ärzte'), Jewish physicians were also persecuted for their political views [7, 49, 50].

Immediately after taking over power in 1933, one of the first steps taken by the national socialist medical leaders was the exclusion of Jewish doctors from the medical establishment. On 7 April 1933, the Law for the Reconstitution of a Professional Civil Service ('Gesetz zur Wiederherstellung des Berufsbeamtentums') was passed expelling Jewish and communist physicians, scientists, and university docents from government employment, professorships at all German universities, public services, and public health insurance programs

[42]. At the level of the scientific societies, the first measures focused on the Aryanization of the boards and higher ranks of these associations. In this regard, the name of Prof. L. Fraenkel (1870–1951) should be mentioned, who, in 1931, was considered for the two-year presidency of the 'Deutsche Gesellschaft für Gynäkologie und Geburtshilfe' (period 1933–1935) [53, 54, 56]. Persistent defamation, isolation, exclusion from meetings of the society, and denial of grants, led to his resignation from the society in 1933. An informal meeting between 'The Third Reich Public Health Minister' ('Reichsgesundheitsminister'; Conte) and Walter Stoeckel, who presided over the meeting of the 'Gesellschaft für Geburtshilfe und Gynäkologie zu Berlin' in 1933, demonstrated the long-term strategy of the National Socialist leaders for a pure Aryan medical system [37, 77].

Das Mitgliedsverzeichnis wissenschaftlicher Gesellschaften braucht nicht 'judenrein' zu sein.—Gegen die Einreise und das Sprechen ausländischer Juden in wissenschaftlichen Sitzungen bestehen keine Bedenken.—Inländische Juden sollten nicht sprechen und sich in ihrem eigenen Interesse zurückhalten.

[The registry of the scientific society does not have to be Jew-free (judenrein). There are no concerns about the invitation of foreign Jews to scientific meetings including presentation of their contributions. However, German Jews should not present and, in their own interest, keep a low profile.]

For the practicing Jewish physicians the situation was initially different. In an order from the Ministry of Labor ('Reichsarbeitsministerium') of 22 April 1933, Jewish physicians were excluded from the public health insurance system ('Krankenkassen'). This was, however, followed by a period when Jewish practitioners could legally regain admission to the insurance system [46, 47]. The safety of readmission to the insurance system led many Jewish physicians to delay a decision to emigrate, and continue to tolerate defamation and discrimination. The Berlin General Practitioner Dr. Ludwig Jaffé wrote to his colleagues just three months before his suicide in Holland, as follows [22]:

Ich glaube, es wäre für alle damals besser gewesen, wenn wir die Krankenkassen nicht zurückbekommen hätten. Ich war kurz davor schon einmal hier, um meine Auswanderung vorzubereiten und gab meine Absichten auf, als meine Praxis wieder begann. Dabei wurden wir nicht etwa in Ruhe gelassen, man hat uns vielmehr schikaniert, wo man nur konnte. Das hatten die Kassenpatienten natürlich bald heraus, und es blieben immer mehr fort. Aber schliesslich hatte ich immer noch reichlich zu leben, konnte mir sogar wieder einen Wagen anschaffen. Vier Wochen nachdem ich den neuen Wagen hatte, kamen die Nürnberger Gesetze heraus. Trotzdem hatte ich noch immer ausreichend zu tun, ja nach meiner dreiwöchigen Haft, während der sogar mein Stempel gesperrt wurde, hatte ich immer noch zu arbeiten. Das ging übrigens bis zum letzten Tag so. Nur ganz wenige meiner Patienten hatten nicht mehr den Mut, weiter zu mir zu kommen.

[I think I would have been better for all if the insurances were not returned. I was preparing my emigration, but gave in when my practice work started to flourish again. We were far from being let alone, on the contrary we were molested in every way. The insured patients noticed that and stayed away more and more. But finally we still had plenty to live on , so I could even buy a new car. Four weeks after the purchase of that car, the Nuremberg Laws came into being. Nevertheless, I still had a sufficient workload, even after imprisonment for three weeks and cancellation my official rubber stamp. And this continued until the last day. Only a few of my former patients lacked the courage to continue visiting my office].

By early 1934, 2,600 physicians, mostly Jewish, were removed from practice. The resulting vacancies in the insurance system were quickly occupied by German doctors who were on the notorious waiting lists that had existed since World War I [42]. In filling these posts, applicants had to produce a spotless National Socialist record, and had to become supporters of the new system [10].

In September 1935, the Nuremberg Race Laws were introduced. The introduction of these laws, which stripped Jews of their citizenship, and triggered the Reich Physician Ordinance in December 1935. This law prohibited the licensing of new Jewish doctors in both insurance and private practice. This and subsequent legislation eliminated Jews from medicine so that by early 1939 only 285 practicing Jewish physicians remained in the Third Reich. [45]. The ''last'' day came on September 30, 1938, when the fourth Directive of the Reich's Civil Laws (4. Verordnung zum Reichsbürgergesetz) of July 25, 1938, declared all property of Jewish physicians as void. Seven hundred and nine Jewish doctors were allowed to provide medical services as unlicensed and non-professional practitioners for the Jewish population [47]. With the Reichskristallnacht in November 1938, professional, social, and economic discrimination turned into overt physical prosecution and extinction.

The emigration of Jewish physicians mirrored the deterioration of their professional, social, and economic status, and reflected the increasing repression of National Socialist policies. The overall number of medical emigrants from the old Reich (pre 1938) is estimated at 6,000 [23, 46]. There were also 3,000 physician emigrants from Austria after its annexation to the Reich in 1938 [34]. About one third (31.7%) emigrated in or before 1933. In 1937, the number had fallen to 6.6% but rose again to 13.7% in 1938 and 11% in 1939. The peak emigration of physicians from Germany occurred,

however, in 1938, when the annexation of Austria and harsh repression triggered mass panic amongst Jewish physicians. In 1938, physicians from Austria accounted for 56% of medical doctors who left Germany that year. Noteworthy in this regard is the high proportion of female physicians among the emigrate doctors. While only 8.5% of German physicians were women, they accounted for 12.5% of emigree physicians. In addition to their race, female Jewish physicians suffered from an ideology that regarded women as inferior and opposed emancipation and double income households [23].

Gynecologists working in the German-speaking part of Switzerland have usually been listed in a year-book containing personal data and the main points of clinical or scientific interests ("Deutscher Gynäkologenkalender"). In order to bring a new edition (1938) up-to-date, the editor, Walter Stoeckel (Berlin), requested from the Swiss Gynecologists, represented by Hans Guggisberg (Bern), to renew the list in order to include them as was the tradition. The new condition, however, was that colleagues with Jewish extraction working in Switzerland should now be banned from that list. On information about that restriction, the Swiss Society of Gynecology at their assembly in Basel (1938) refused to comply with Stoeckel's demand. Consequently, all German-speaking Swiss Gynecologists were not listed in the new edition but were excluded altogether, disregarding if Aryan or non-Aryan [53].

Jewish Gynecologists in the 'Gesellschaft für Geburtshilfe und Gynäkologie zu Berlin' and in the 'Deutsche Gesellschaft für Gynäkologie and Geburtshilfe' during 1933–1945

The 'Berlin Society for Obstetrics and Gynecology' 1933–1945

The first meeting of the society under the new rulers on 3 February 1933, was still unaffected by political change. The meeting was presided over by Robert Meyer (1864–1947), the founder of the rapidly evolving field of gynecological pathology [90]. His highly respected colleague Bernhard Zondek (1891–1966), another Jewish scientist and physician who made significant contributions to the field of gynecological endocrinology, was elected to the board of the society [90, 91]. After two further meetings, none were held for 8 months. After this break, the new president G.A. Wagner (1873–1947) opened the congress with the remarks that the scientific activities of the society had to pause because the "great times of the formation of a new Germany" required the fulfillment of other obligations [92]. In the meantime, the process of 'Gleichschaltung', the enforcement of political conformism with National Socialist doctrine and politics, had reached the society.

From now, the acting president was not elected by the members of the society but appointed by the new medical authorities. W. Stoeckel was installed as the first acting president of the society under the new rulers. He gained experience with the process of "Gleichschaltung" as chairman of the "Deutsche Gesellschaft für Gynäkologie und Geburtshilfe" over which he had presided since 1931. During that time he gained the trust the National Socialist rulers by tolerating the expulsion and discrimination of Jewish members from the society [73]. From December 1933, under his chairmanship, the meetings of the society were reduced to a month, which according to Stoeckel [93] "entspricht nicht unserem Status, aber es entspricht der heutigen Zeit" [does not reflect the status of the society, but the needs of today]. Despite the obvious demonstration of conformity with National Socialist party guidelines and the new political tone within the society and in smaller circles Stoeckel tried to maintain some respect for its Jewish members. For example, during the 70th birthday celebrations of Robert Meyer, the former head of the Division of Gynecologic Pathology at the 1st University Women's Clinic of Berlin (since 1912), he described Meyer as [94].

"Mann von Weltbedeutung , dessen Ehrentag ein Ehrentag der gesamten Gynäkologie sei" [a man of worldwide importance whose day of honor is a day of honor for the whole specialty of gynecology].

However, this did not prevent Robert Meyer from having to leave Germany in 1939 at the age of 74.

During the following years under Walter Stoeckel (1871–1961), head of the Women's University Clinic in Berlin (1926–1950), the society adopted the rhetoric of the National Socialists at its meetings and congresses [77]. The process of discreditation and expulsion of Jewish gynecologists continued with increasing radicalism. However, on various occasions, critical comments about the declining influence of the society under National Socialism were also heard. Reflecting on the decreasing status and influence the society had since its adoption of National Socialist themes together with a reluctance of many practicing gynecologists to join and play an active role in the society,

Stoeckel stated in 1934 [77] "*... dass die von der Gesellschaft ausgehenden Impulse seltener und schwächer geworden seien... Wir können nur hoffen, dass wir in unserem Aufstieg noch eine Zeit erleben werden, die wieder ruhigere Stimmungen bringt und in der sich auch das wissenschaftliche Arbeiten wieder fruchtbarer gestalten kann. ... Die Tradition unserer ganzen Vergangenheit und die Verantwortung vor der Zukunft gebieten uns gerade jetzt, alle Kräfte anzuspannen, um unsere Gesellschaft nicht herabsinken zu lassen auf das Niveau unbedeutender Unbeachtlichkeit. [translation*: the influences of the society have diminished.... We can only hope that we will live to a time with greater

tranquility when scientific work will once more be fruitful ... Our tradition and our responsibility to the future demands that we strengthen our society and do not allow it to sink into insignificance].

He appealed to the practicing, non-university gynecologists of Berlin to rejoin the society which at the end of 1934 had suffered a massive member loss due to the expulsion of its Jewish colleagues. In 1934, Stoeckel listed 235 members. However, in 1939 and 1941 only 146 and 184 names were listed, respectively [95, 96, 99]. The names of such distinguished physicians as Selmar Aschheim, Ernst Gräfenberg, Hans Lehfeldt, Robert Meyer, Erwin Strassmann, and Bernhard Zondek had disappeared. In 1935, the chairmanship was transferred to G. A. Wagner (1873–1947; then chairman of the Department of Obstetrics and Gynecology at the Charité, Berlin [1928–1946]). Shortly thereafter, Stoeckel became an honorary member. Official and public statements now completely conformed with National Socialist propaganda. The last mention of a Jewish gynecologist was a brief remembrance of Paul Strassmann, the well known head of his private Berlin Women's Clinic, who had suddenly died in Gstaad, while in exile in Switzerland in October 1938 [97]. At that time, V. Stuckrad, member of the National Socialist party, had became president and G.A. Wagner was admitted to honorary membership.

With the beginning of World War II, the society joined other organizations in its unconditional support of the war and its National Socialist goals [98]. In spring 1941, W. Stoeckel was named honorary president, a honor only Adolf Gusserow (1836–1903) and Robert von Olshausen (1835–1915) had received. The last congress was held in a bunker in June 1943. National Socialist and racially motivated themes, like the role of German Gynecologists in the protection of the German society from genetically inferior offspring, including expansion of the infamous sterilization program, were keenly discussed. Because of two contributions from the Berlin anatomist Hermann Stieve (1886–1952), presenting histologic material from women executed in prisons or concentration camps, the society became involved in National Socialist atrocities [100, 101].

Between 1933 and 1943, there was a significant decline in scientific standards. Not only did the number of publications plummet but the society itself underwent a process of scientific atrophy with its infrequent meetings, its failure to recruit new members, and the introduction and dominance of politically and racially motivated themes

The 'Deutsche Gesellschaft für Gynäkologie and Geburtshilfe' 1933–1945

From its outset the society was meant to be an academic body. The members were pledged to publish, be it on clinical or on basic research topics. The dawn of political

Ludwig Fraenkel (1870–1951); this portrait adorned and introduced the volume 141 of Archives of Gynecology, edited in his honor (1931)

influence could already be observed during the 22nd congress of the German Society of Gynecology (founded in 1885), held in Frankfurt September 27–29, 1931, under the presidency of Prof. Ludwig Seitz, Frankfurt [54]. The president had asked Prof. Ludwig Fraenkel, then Chairman of the Department of Gynecology and Obstetrics at the University of Breslau (capital of Silesia in Germany, now Wroclav, Poland) to prepare a lecture on "Sterilisierung und Konzeptionsverhütung" [Sterilization and Contraception]. Fraenkel delivered a brilliant lecture at the plenary session, distributed in print prior to the meeting [21] and by doing so stunned a lively discussion, a transcript of which was published [21]. One of the speakers against was August Mayer (1876–1968), Tübingen, who later himself became president of the Society (1934–1935), nominated in the year 1933 instead of Ludwig Fraenkel. He challenged the assembly by asking the colleagues when discussing Fraenkel's report: "Was gedenkt die Deutsche Gesellschaft für Gynäkologie gegen die Zeitströmung mit ihrer hemmungslosen Hingabe an den Trieb zu tun?" [What does the German Society ... intend to do about the present permissive attitude to sexual desire?]. The terms were set. The mood of the assembly was as if those against contraception and abortion be hailed as saviours of social welfare and the purity of the German people, while the advocates of contraception and abortion be rather seen as agents of moral degeneration. That the keynote speaker on that topic in 1931 was a Jew made things even worse in the eyes of the nationalist-minded colleagues. This is but one example of the diversion of the traditional scientific aims of German Gynecologists from science and rationalism to politically flavoured eugenics and the supposed creation of a "pure" German race uncontaminated by non-Aryan blood [53, 54].

On 30 January 1933, the Reichspräsident Hindenburg installed Adolf Hitler, being the head of the national-socialist party (NSDAP), as Chancellor. Germany progressed rapidly from a democratic society to a one-party(Nazi)-state. The German Society of Gynecology was not spared. It soon lost its professional independence and was connected to the "Reichszentrale für

Gesundheitsförderung" (1933), which was strongly a political body, governed by bureaucrats. Elections were no longer free but were subject to political endorsement [53]. The profession itself got streamlined and so were the scientific programs of the biannual meetings. The next congresses [names of presidents put in brackets] were held in 1933 (Walter Stoeckel), 1935 (August Mayer), 1937 (Georg August Wagner) and 1941 (Hans Fuchs) [54]. Among the topics on the scientific program were research on twins (1933); eugenic indications for sterilization and abortion (1933); climate and balneotherapy (1935); experiences with eugenic sterilization (1935); vitamins and antiinfective medication (1941); human constitution and hormones (1941). Only G.A.Wagner from Berlin, the most liberal among the four presidents of that period, insisted on including classical topics as heart-disease and pregnancy; prolapse; surgery and circulation; surgery in impaired fertility (1937).

It was W. Stoeckel, Berlin, who managed to keep the eminent gynecologic morphologist Robert Meyer in office until 1938. He was then forced by a letter from the "Reichsminister für Wissenschaft, Erziehung und Volksbildung" (Dec 1st, 1938, see Fig. 1) to dismiss him. Robert Meyer was emigrated and lived his last years in the United States. He died in 1947 in Minneapolis.

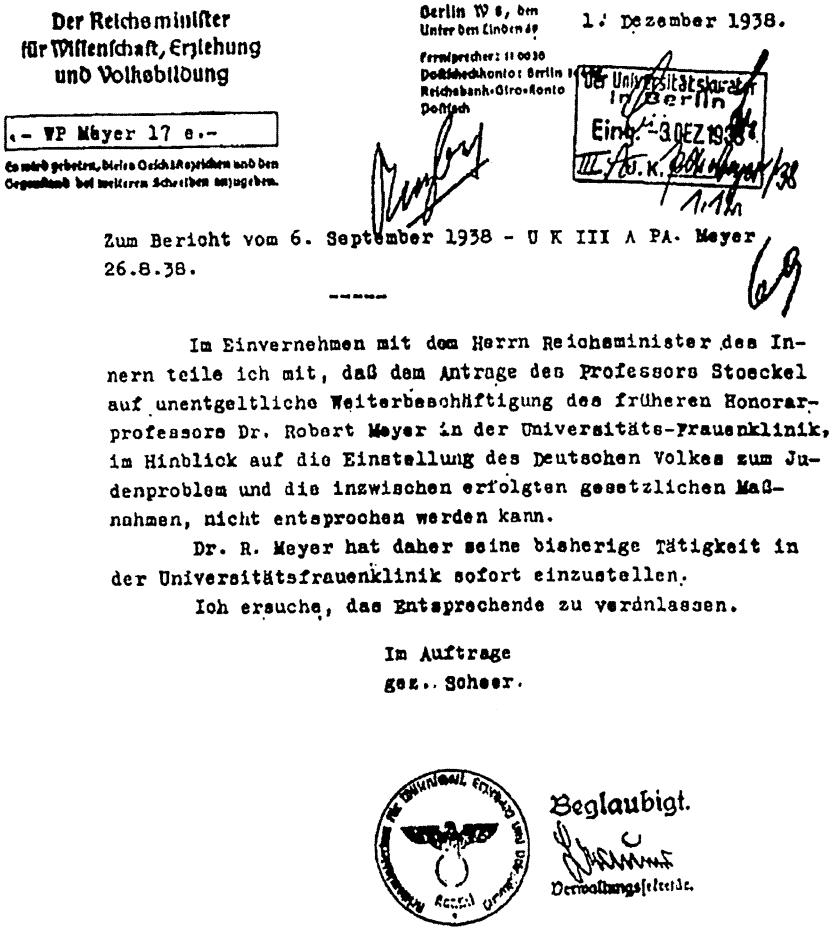
[Translation"In agreement with the Minister of the Interior I am notifying you that the request of Prof.Stoeckel to employ the former Honorary Professor Dr. Robert Meyer without remuneration at the Women's Hospital of the University cannot be allowed due to the attitude of the German people towards the problems with Jews and according to the legal measure which have been put into effect. Dr. Meyer has to terminate his activities at the Women's University Hospital immediately. I ask you to take the appropriate action without delay"].

The following eight biographical notes of distinguished Jewish Gynecologists show the personal and academic suffering of Jews in our discipline and should speak against discrimination and expulsion of an entire professional group.

Biographies

Wilhelm Alexander Freund

W. A. Freund was born on August 26, 1837, in Krappitz in Upper Silesia. His family was of Jewish descent. He



Der Reichsminister
für Wissenschaft, Erziehung
und Volksbildung

Berlin W 8, den 1. Dezember 1938.
Unter den Linden 69

Fernsprecher: 11 00 30
Postscheckkonto: Berlin
Reichsbank-Giro-Konto
Postfach

Der Universitätskurator in Berlin
Eing. 3 DEZ 1938
III. Abt. K.

- WP Meyer 17 e.-

Es wird gebeten, Diese Geschäftszeichen und den Gegenstand bei weiteren Schreiben anzugeben.

Zum Bericht vom 6. September 1938 - U K III A PA. Meyer 26.8.38.

Im Einvernehmen mit dem Herrn Reichsminister des Innern teile ich mit, daß dem Antrage des Professors Stoeckel auf unentgeltliche Weiterbeschäftigung des früheren Honorarprofessors Dr. Robert Meyer in der Universitäts-Frauenklinik, im Hinblick auf die Einstellung des Deutschen Volkes zum Judenproblem und die inzwischen erfolgten gesetzlichen Maßnahmen, nicht entsprochen werden kann.

Dr. R. Meyer hat daher seine bisherige Tätigkeit in der Universitätsfrauenklinik sofort einzustellen.

Ich ersuche, das Entsprechende zu veranlassen.

Im Auftrage
gez.. Scheer.

Beglaubigt.
Verwaltungsfekretär.

Fig. 1 Facsimile. Letter of dismissal concerning Prof. Robert Meyer, Berlin, 1 December 1938

Wilhelm Alexander Freund (1833–1917)

initially wanted to study architecture but his application at the Royal High Academy of Prussia was rejected with the remarks that Jews are not admitted. This left, beside a career as a merchant, only studies of medicine open to him. He went to the University of Breslau where he graduated in 1854. There he met his long term mentor Prof. J. W. Betschler (1796–1865), the director of the Breslau Women's Clinic, who attracted him to the new field of gynecology. After his doctoral thesis in 1855 and a short volunteer period at the Charité in internal medicine, he began his career as an assistant at the Breslau Women's Clinic. His further career was typical of that time: He "habilitated" in 1860 and became an extraordinary professor in 1864. The first post as an extraordinary professor involved no teaching privileges and was unpaid. During that time he was approached by numerous prestigious institutions to further advance his career by converting to Christianity and getting baptized. Despite financial difficulties and the death of his mentor and his wife he did not change his religion. In 1879, he accepted an offer of full professorship ("Ordinarius") at the University of Strasbourg in succession to Gusserow. Members of the Medical Faculty of the University of Strasbourg at that time were distinguished physicians like Waldeyer (1836–1921), Kussmaul (1822–1902), und von Recklinghausen (1833–1910). Here he could develop into one of the most respected gynecologists of his time. With the discovery of general anesthesia, the Lister carbolspray technique, and recent successes with ovariotomies and myomectomies, the main obstacles of infection, bleeding, and pain control were solved. By applying the anatomical knowledge, Freund added to these achievements the technique of the first abdominal hysterectomy [25]. He operated on his first patient on 30 January 1878 [25, 84]. The operation was a success and was not significantly different from the simple total abdominal hysterectomy of today. It was Freund who first advocated the attachment of the peritoneum and all pedicles to the vaginal vault [9]. Shortly after his description, many improvements and innovations evolved including the closure of the peritoneum over the vaginal vault [51, 57]. His method initially widely welcomed, soon attracted critical comments. With the beginning of the 1880s, the Freund's operation had disappeared from the operative armentarium of gynecologists. The relatively low mortality of vaginal hysterectomy as described by V. Czerny (1842–1916) was responsible for the fall from favor of the abdominal route [12]. However, the need for a more radical approach, including pelvic lymphadenectomy, together with falling mortality rates, let to re-introduction of the abdominal approach of Freund [16, 26]. Most importantly, Freund started the German Society of Gynecology by inviting leading gynecologists to a meeting at Strasbourg in 1885, on the occasion of the 50th assembly of the "Naturforscherversammlung" [52, 84]. W.A.Freund died in 1928 in Berlin-Wilmersdorf.

Paul Ferdinand Strassmann

Paul F. Strassmann was born in a Jewish family in Berlin on 23 October 1866. His father Heinrich was a physician who had an active interest in public health. Paul F. Strassmann studied medicine in Heidelberg and Berlin. Early in his career he developed an interest in women's health. His doctoral thesis on multiple pregnancies was accepted by the Faculty of Medicine of Berlin University in 1889. He took up his first post as an assistant at the University Women's Clinic Giessen before he went to England in 1891. He returned to Germany in 1892 and until 1900, was assistant at the Gynecological and Obstetric Policlinic of the Charité in Berlin. With the help of his father and his family he built one of the first private Women's clinics in Berlin of which he became

Paul F. Strassmann (1866–1938), Berlin

the director in 1900. During his 33 years as owner and director, the clinic also served as an educational and research center for all aspects of obstetrics and gynecology. In 1907, Paul F. Strassmann became private docent at the University of Berlin and in 1919 extraordinary professor. During World War I, he served as practicing field surgeon on the Western front. After the war, he resumed his position at his private Women's Clinic in Berlin. From 1927–1928 he was in the United States.

During these years, his scientific interest extended to the fields of surgery, urology, hygiene, and sports medicine. He was honorary member of numerous scientific organizations and societies including the 'Berlin Society for Obstetrics and Gynecology', whose first chairman he was from 1925–1926. He was a member of the Medical Faculty of Berlin University from 1928–1930 and in 1930, chairman of the Medical Society for Sex and Constitution Research of Berlin. He was honorary member of the Gynecological Society of St. Louis and the Berlin Athletic Club. Like his father, he saw gynecological and obstetric problems in a public health context. He published on all aspects of Women's health [79, 80]. His name became known for his method of detecting placental detachment in the 3rd stage of labor (Strassmann phenomenon, 1903 [78]). Because of his Jewish background Paul F. Strassmann was one of the first gynecologists affected by the suppressive measures of the National Socialist government in Germany in 1933. He was stripped of his positions and his clinic in Schumannstrasse in Berlin was closed. He emigrated to Switzerland where he continued to work as a specialist in obstetrics and gynecology. The circumstances of his death in Gstaad on 15 August 1938 remain unclear. Although suicide was most frequently cited in the literature, a personal note from his son, Prof. Erwin Otto Strassmann, stated that Paul F. Strassmann died due to pancreatitis [95].[1]

Ernst Graefenberg

Ernst Graefenberg was an assistant (resident) at the Department of Obstetrics and Gynecology, University of Kiel, under the directorship of R.Werth (1850–1918) and J. Pfannenstiel (1862–1917). In 1910, Graefenberg left the university to begin practical work as a gynecologist with a private office in Berlin-Schöneberg, but he continued his clinical research on intrauterine contraception. Being a pioneer in that field, he developed the first intrauterine loop out of silver-wire in order to make the "Graefenberg-Ring" sufficiently flexible to be introduced into the uterine cavity [28, 29, 54].

[1] The last letter from P. Strassmann addressed to his son Erwin proves that suicide is improbable; the presumed cause of death being pancreatitis. The death of P. Strassmann is described by his family as painful and dramatic. We are indebted for this information to the grandson of P. Strassmann, Prof. W. P. Strassmann, Michigan State University (USA).

Ernst Graefenberg (1881–1957)

He was a member and in 1928 even president of the International Society of Sexology (Berlin). Having been accused of unsafe practices and prosecuted as a Jewish doctor, he was imprisoned but later released on bail. After emigrating via Siberia and Japan, he reached California, later worked as pathologist in Chicago and finally again as a gynecologist in New York until 1953. He suffered from Parkinson's disease and died on 28 October 1957 in New York.

Ludwig Adler

Ludwig Adler was born on 7 November 1876 in the province of Moravia (Mähren) of the Austrio-Hungarian empire (today Czech Republic). He studied medicine in Vienna and graduated in 1900. He started his career at the First Clinic for Syphilology and then moved to the Pathologic-Anatomical Institute of the University of Vienna where he stayed for 2 years. This training should have proved extremely beneficial for his future scientific endeavors. From 1904, Ludwig Adler was an assistant at

Ludwig Adler (1876–1958)

the First Clinic of Gynecology at the University of Vienna. There he met Fritz Hitschmann who would become his mentor and lifelong close friend. Although his scientific collaboration with Hitschmann ended in 1913, he called him a dear friend to his dying day [3, 24]. The scientific collaboration between Ludwig Adler and Fritz Hitschmann was carried out under difficult external circumstances and brought fundamental insights into the function of the endometrium and revolutionized the understanding of the menstrual cycle. The common opinion up to that point was a ''theory of endometritis'' developed by Carl Ruge II [55, 71], which stated the various states of the endometrium the result of inflammation. This included several different pathologic entities like hyperplasia, bacterial endometritis but also the physiologic stages of the endometrium including the proliferative and secretory phases. At the beginning of the twentieth century, the gynecological scientific community could not understand the physiologic changes of the endometrium. Based on only 58 cases with an accurate menstrual history and meticulous histology, Adler and Hitschmann found in curettings and hysterectomy specimens that the histologic appearances of the endometrium during the menstrual cycle are repeated and that 'endometritis glandula hypertrophica or hyperplastica' had nothing to do with inflammation [31, 32]. The fundamental breakthrough was the distinction between the pathological forms of endometritis and the physiologic infiltration of the endometrial stroma in the premenstrual phase with inflammatory cells. These conclusions were received with intense interest, and made it clear that plasma cells are a 'sine qua non' for the diagnosis of endometritis. Adler and Hitschmann recognized that the functional changes of the endometrium in the first half of the cycle can be variable in duration but, on the other hand, that the premenstrual phase had a very uniform time span [33]. They differentiated a postmenstrual (proliferative) phase from midcycle (peak proliferative phase) and a premenstrual (secretory) phase. Their results based on beautifully drawn micrographs, which became classics (Fig.2) [32, 43]. Although the link with ovarian function was unknown at this time [1], in one of their last joint articles in 1913, Adler and Hitschmann pointed to a possible role of ovarian function in menstrual regulation [33].

In 1912, Adler moved from the histology laboratory to the newly established radium department of the University of Vienna where he remained scientifically active and published the first clinical studies on radiotherapy for gynecological tumors [2]. During that time he also earned a legendary reputation as a gynecological surgeon. His specialty was the radical vaginal hysterectomy, as devised by Friedrich Schauta (1849–1919) originally for advanced carcinoma of the cervix, with implantation of radium into the parametria. His skill with this procedure brought him an international reputation. In 1920, after Schauta's death, he became deputy chairman and professor of the First Clinic of Gynecology in Vienna. After 1921, he was in charge of the two

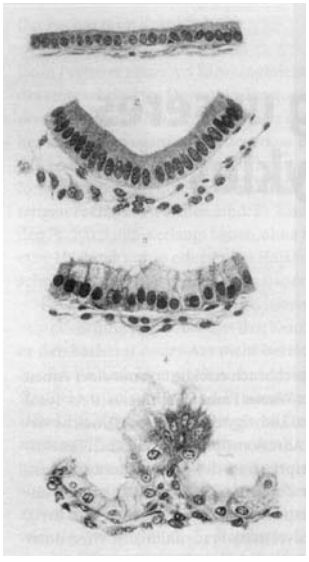


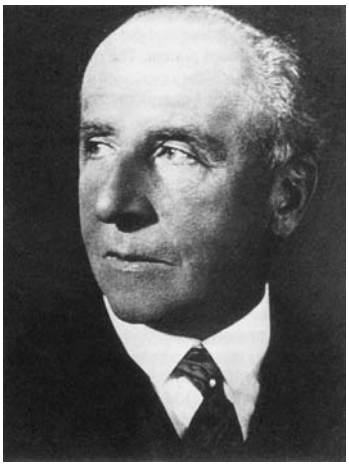
Fig. 2 Changes of endometrial glandular epithelium: first line: postmenstrual; second line: peak proliferative; third line: secretory; fourth line: premenstrual pattern. From F. Hitschmann and L. Adler: Gestaltwandel des endometrialen Drüsenepithels im Zyklus. Monatschr. Geburtsh.Gynäk. 1908, 27:1–8 [32].

obstetric–gynecological departments at the Wilhelminen Hospital and the Kronprinz-Rudolf-Stiftung in Vienna. One of his predecessors had been Ernst Wertheim (1864–1920). This position he held until Austria's annexation by the National Socialist Germany in 1938. Fourteen days after the German annexation he and his family were able to emigrate to the United States. Many Jewish doctors left Vienna at that time, amongst them Sigmund Freud. Adler quickly adapted to the new system and became a popular gynecological surgeon at Beth Israel Hospital in New York [48]. He was made honorary member of the American Association of Gynecological and Abdominal Surgeons and became a member of other prominent gynecologic–obstetric societies in the USA. He died in 1958 at the age of 82.

Robert Meyer

A complete appreciation of Robert Meyer's life and work would greatly exceed the space limits of this review. Thus, this biographical itinerary can therefore only be considered an inadequate attempt to understand his monumental contributions.

Robert Meyer was born on 11 January 1864 in Hanover, Lower Saxony. After a humanistic education and graduation from the Gymnasium in 1883, he began studies of medicine in Leipzig. There, he met the great histopathologist Wilhelm His (1863–1934) who stimulated Meyer's interest in the new specialty of embryology. His numerous extracurricular activities included music as his favorite. He met Brahms and Grieg during his studies. In 1884, he was transferred to the University of Heidelberg where he met his future wife Leonie and



Robert Meyer (1864–1947)

then to Strasbourg where under von Recklinghausen, Virchow's first assistant, he learned the fundamentals of pathology, the art of dissection, and how to prepare histological sections. At that time, however, he had no desire to become a pathologist. It was his mentor Prof. Kussmaul in Strasbourg who advised the young Meyer that the best way to learn medicine was to practice as a country doctor. After a short internship at the Friedrichshain Hospital in Berlin, where he met Robert Koch, he followed Kussmaul's advice and purchased a practice in the small village of Dedeleben in Saxonia. In 1894 at the age of 30 years, he decided to trade his country practice for a larger general practice including obstetrics in Berlin. There, he was asked if he would like to work with Johann Veit (1852–1917), director of the University Gynecological Clinic of the University of Berlin. He accepted Veit's invitation to assist at operations and to take charge of a small pathology laboratory in Veit's private clinic. Reviving his old interest in embryology, he began to study fetal organs clarifying malformation of the female genital tract. By publishing in Veit's 'Handbuch der Gynäkologie' he started to make a name for himself. He transferred the small laboratory from Veit's clinic to his home and started to prepare all the histological sections by himself. Overwhelmed by the number of preparations, his wife Leonie soon became a skillful histotechnologist and was his assistant over the next 30 years. He gradually realized he wanted to devote his life to pathology. In 1908, the director of gynecology at the Charité, Ernst Bumm (1858–1925), approached Meyer, then 44 years old, to lead the laboratories of the gynecological services with the title of Professor. Meyer accepted the offer, gave up his clinical duties, and now embarked on a career as a full-time academic pathologist. His next years in Berlin were extremely busy and productive with studies on the embryology of gynecological neoplasms. He refuted Cohnheim's concept of neoplasia originating from embryonic inclusions or remnants by showing that most of these mature and stop growing [61]. He published the first studies on ectropion of the cervix in the newborn and adults [59, 60]. He was able to show that ectopic foci of endometrium in the myometrium stemmed from the endometrium [58]. In 1924, he opposed Sampson's implantation theory about the histogenesis of endometriosis by postulating that ectopic foci of endometrium in the wall of the fallopian tubes, lymph nodes, or the peritoneum of the abdominal cavity arose from coelomic epithelium [62].

In 1912, he succeeded Ruge as director of the Institute of Pathology at the University Gynecological Clinic. During World War I, Meyer served as a surgeon in a military hospital near Brussels. He found time to start new fundamental studies on the histogenesis and classification of ovarian neoplasms. In 1918, he was able to return to Berlin and resume his work at his institute. In 1923, Meyer accepted an invitation to lecture in Sweden and Norway. In the same year he published his paper on the coelomic histogenesis of endometriosis. Between the years 1923 and 1925, he focused on problems of carcinogenesis [63] and the newly discovered hormonally functioning neoplasms of the ovary [65]. He published his observations on the correlation between the chemical contents (lipoids) and the histological and histochemical changes of the Corpus luteum and the ovary during the menstrual cycle and pregnancy [64, 66]. He made contributions to nearly all standard gynecological textbooks including some hand-drawn illustrations. In 1931, at the age of 67, he traveled and lectured in the United States at the invitation of the American Gynecological Society [13].

In 1932 he started his ground-breaking studies on the embryological development of the vagina [67], based on a series of 112 fetal sections. At this time, he felt, for the first time, ethnic isolation because he had a Jewish grandmother. But many friends remained supportive. On 23 February 1932, the medical faculty of Berlin conferred on him the title of "Honorary Professor". His 70th birthday was celebrated in the presence of the presidents of the Pathology and Gynecology Societies, the directors of the University of Berlin, and many other distinguished scientists. A bronze bust of him was erected, and at the meeting of the 'Gesellschaft für Gynäkologie und Geburtshilfe zu Berlin', its president W. Stoeckel delivered a eulogy (see above). However, less than a year later his 'Honorary Professor' title was rescinded by the National Socialist rulers. At the end of 1935, he was officially dismissed from his professorship (Fig. 1). He was able to continue work at his Institute without a salary by collecting fees for his consultations. At the end of 1938, he was notified by the Minister of the Interior that Germany no longer needed him, and that he should leave the country. Shortly before the outbreak of World War II he reached the Netherlands. Through the help of Dr. J. McKelvey, who had spent a year working with Meyer in Berlin, he received an offer from the University of Minnesota. There, at the age of 76, he started work in his new position as Associate Professor of the University. He continued his studies on vaginal anomalies, early cervical cancer, and neurogenic

neoplasms. In a historical article of the Minnesota Medical School Wilson wrote [83]:

> "*...during his seven years in Minnesota, Dr. Meyer left a deep impression on gynecology and obstetrics by showing how necessary an exact knowledge of histology was to the making of sound clinical decisions*".

On 8 December 1941 his wife died suddenly. At the age of 81, in 1944, he went into semi-retirement and on 12 December 1947, Robert Meyer died of gastric cancer.

The scientific work of Robert Meyer covered embryology of the female genital tract, the entire spectrum of gynecological histopathology, including ovarian tumors, the early diagnosis of cervical cancer, the functional changes of the Corpus luteum and endometrium, trophoplastic tumors, endometriosis and teratological pathology. His institute attracted scientists and scholars from all over the world.

Selmar Aschheim

Selmar Aschheim was born in a Berlin Jewish merchant family on 4 October 1878. He studied medicine in Berlin and Freiburg im Breisgau and his dissertation (doctoral thesis) in 1902 was on erythropoesis. He was trained as a gynecologist and obstetrician at various clinics in Berlin, Munich, and Hamburg before opening his private office in Berlin in 1905. In 1908, he entered the Women's Clinic of the Charité of Berlin as a voluntary assistant and worked in the laboratory of Robert Meyer (1864–1947) the founder of gynecological pathology [16, 30]. When Meyer left in 1902, Aschheim became head of the laboratory. With the outbreak of World War I, he was made head of the gynecological Policlinic of the Charité before military service took him to Turkey, the Balkans, and France. He returned in 1919 to the Charité where he met the young Bernhard Zondek who had just started his gynecological training. Aschheim worked in the laboratory in the morning and in the afternoons in his private practice. A very fruitful collaboration between him and Bernhard Zondek culminated in the description of the first early pregnancy test in 1928 [4, 5]. Urine from pregnant women injected into infantile mice induced follicular development and luteal atresia. This model allowed Aschheim and Zondek to identify the anterior pituitary gland as an endocrine organ involved in ovarian function.

His attempts to obtain an extraordinary professorship were unsuccessful until 1931 when Selmar Aschheim was already 51 years of age. In 1936, he was dismissed from the Friedrich-Wilhelms-University of Berlin and his teaching privileges were revoked. He had to use the title 'previous honorary professor of the medical faculty of the University of Berlin' [96, 97]. Soon after revocation of his academic privileges he emigrated to France. He got appointments at the Collège de France and various hospitals. In 1937, he became a French citizen and was promoted to the post of 'Directeur de Recherche at the Centre National de la recherche scientifique' allowing him to continue his histopathological and endocrine studies. He survived the German occupation hidden in the Paris underground. Selmar Aschheim died in Paris on February 15, 1965 at the age of 87.

Bernhard Zondek

Bernhard Zondek had Jewish parents and was born on 25 July 1891 in Wronke, Posen. In 1911, together with two of his brothers, he began studies of medicine at the University of Berlin. With the outbreak of World War I he was drafted for military service and was sent to the Western Front. In 1918, he resumed his studies and graduated from the University of Berlin in the same year. His following doctoral thesis focused on investigation of the pathology of the nephrosis completed in 1919 at the 1st Medical Clinic of the Charité. However, it was the field of gynecological endocrinology that attracted him and with Selmar Aschheim he made some

Selmar Aschheim (1868–1965)

Bernhard Zondek (1891–1966)

fundamental discoveries. He joined the Department of Obstetrics and Gynecology of the Charité in Berlin as a voluntary assistant without pay. In October 1922 he presented an extensive thesis including clinical and experimental studies of the function of the ovary. Though his work evoked a positive response from the referees, a decision about promotion to a private docent position was postponed (Universitätsarchiv Humboldt Universität Berlin 1922–1924 [81]).

It was Karl Franz (1870–1926), the chief of the Women's Clinic of the Charité and his long-term mentor, who advised Bernhard Zondek to work closely with Selmar Aschheim when investigating the physiological effects of different ovarian preparations [85]. At the end of their experiments for an early pregnancy assay (Aschheim-Zondek-Test; the injection of urine of pregnant women causes an ovarian reaction in infantile mice), they stated that proving the applicability of the new test to clinical practice was only one of their goals [4, 5]. The new assay, could also be used to further elucidate of the relation between the functional status and histopathological appearance of the ovary and the anterior pituitary gland [86–89].

Although the AZT was technically laborious and not suitable for routine clinical use, it represented a hormonal assay that was well ahead of its time [4, 5]. Five young infantile mice were injected with 1 to 2 cc of urine. With urine from pregnant women on day 4, the ovaries of the animals showed at least three changes: 1. Large follicles. 2. Vascularized follicles. 3. Atresia of the Corpora lutea. This reaction was named 'Hypophysenvorderlappenreaktion' (reaction of the anterior pituitary gland) by the authors since extracts of the anterior pituitary gland could do the same [4, 5, 6]. In addition, Aschheim and Zondek described a general hyperemia of the abdominal organs and swelling of the uterine horns if the urine came from a pregnant woman. The accuracy of the method after the first 2,000 tests was estimated at 98.9% (17 false negatives and 5 false positives). With the availability of a reproducible in vivo pregnancy test, the authors could go further and later prove the regulating influence of the anterior pituitary gland. Later, the AZT was modified and other animal models were used [6]. However, it was not until 1950s that HCG was discovered [27].

After becoming a private docent, he received in 1926 an offer for an extraordinary professorship at the University of Berlin. He became chief of the gynecological clinic at the 'Städtisches Krankenhaus Berlin-Spandau'. His teaching privileges and commitments at the Charité were not affected by this move. At his new workplace, he found better conditions for his research and actively continued his endocrine studies.

Bernhard Zondek was one of the first victims of National-Socialism. Immediately after Hitler's rise to power, he had to give up his position at the 'Städtisches Krankenhaus Berlin-Spandau'. In September 1933, his teaching privileges at the University of Berlin were revoked. In the same year, he left Germany and emigrated to Sweden at the kind invitation of Prof. Hans Euler, the Director of the Biochemical Institute of the University of Stockholm. He spent several months as a research assistant. In 1934, he left Sweden and settled in Palestine. The Hadassah Hospital, Jerusalem provided him with a hormone laboratory in the basement of an old Arabian house and later appointed him as Professor of Gynecology and Obstetrics. Over the next decades he was actively involved in the transformation and development of the medical system of Palestine and later of Israel. As member of the Medical Reference Board of Hadassah, an American Zionistic organization involved since the 1910s in improving health standards in Palestine, he helped to establish the American model of medical training. There was some resistance to this because nearly all leading physicians in Palestine/Israel were emigrants from Central Europe who had been trained under the old German/Austrian system. The German method comprised formal lectures, while the American method involved preparatory courses in science, bedside teaching in small groups and clinical seminars. Bernhard Zondek was a key member of the Medical Reference Board of Hadassah which decided in 1947 to adopt the American system. Bernhard Zondek continued his endocrine studies at the Albert Einstein College in New York and died there on 15 November 1966.

Ludwig Fraenkel

Ludwig Fraenkel was born on 23 April 1870 in Leobschütz (Silesia). He had a protected childhood. After completing Gymnasium in 1888 he studied medicine at the Universities of Würzburg, Berlin, Greifswald, Munich and Freiburg. His doctoral thesis on ankylosis

Ludwig Fraenkel (1870–1951) photograph from the collection of MariusTausk [from 84]

of the elbow joint was accepted by the University of Berlin in 1892. In the next 4 years he trained as a pathologist before he joined the gynecological private clinic of his uncle Ernst Fraenkel (1844–1921) in Breslau in 1896. In 1905, the medical faculty of the University of Breslau appointed him as a private docent and awarded him the title of professor in 1909. He became extraordinary professor for gynecology and obstetrics in 1921, and in 1922 was offered the Chair of Gynecology and Obstetrics at the University of Breslau.

Ludwig Fraenkel's scientific interests involved the very young field of gynecological endocrinology and in particular the role of the Corpus luteum [17]. In 1901, he hypothesized that the Corpus luteum was in fact an endocrine gland [18, 19, 56]. He based his theory on his observation that early castration of pregnant rabbits as well as excision or destruction of the Corpus luteum early in pregnancy either prevented implantation of the fertilized egg or led to loss of the pregnancy (1903) [19]. It was nearly 2 decades before the importance of his findings were fully recognized. Up to then, E.F.W. Pflüger's (1829–1910) concept of a neuronal regulation of the menstrual cycle held sway. In his original article of 1903, Fraenkel put forward experimental evidence that showed that the Corpus luteum was an endocrine gland and responsible for the cyclic changes of the endometrium [19]. He later extended his studies with organ extracts he tested on humans [20, 56]:

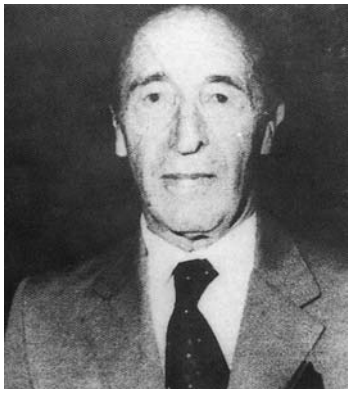
> *"An Stelle der vielen Hypothesen über den Zusammenhang zwischen Ovulation und Menstruation, an die Stelle der Pflüger'schen Theorie und anderer, welche jeden Zusammenhang leugnen, haben wir jetzt das sicher bewiesene Gesetz: Die Menstruation hat ihre Ursache in der sekretorischen Tätigkeit des Corpus luteum. Nicht der Druck des wachsenden Follikels auf die Eierstocksnerven ist es, welcher die Menstruation hervorruft, sondern die Tätigkeit des gelben Körpers. Denn er veranlasst die cyclisch-vierwöchentliche Hyperämie des Uterus, welche entweder zur Schwangerschaft oder zur Menstruation führt" (1903).*

> *[translation: Instead of many hypotheses about the connection of ovulation and menstruation, instead of the theory by Pfüger and others, we now have a properly evaluated law: Menstruation has its cause in the secretory function of the Corpus luteum. It is not the pressure of the growing follicle on the nerves of the ovary which evokes menstruation, but the function of the yellow corpus. This is what induces the cyclic, four weekly hyperemia within the uterus, leading either to pregnancy or to menstruation].*

Fraenkel's scientific style was remarkable. He never wrote abundantly. His main contributions were summarized in two beautifully illustrated articles, the first [19] on 107, the second [20] on 56 pages. Ludwig Fraenkel reached the peak of his career in 1931. When he had become a leading figure in German gynecology, he was a candidate to be elected for presidency of the 'Deutsche Gesellschaft für Gynäkologie und Geburtshilfe'. During that time he became an advocator of contraception, a liberal view that stood in sharp contrast to the NAZI-biological ideology of that time [21]. After the rise of Hitler, Fraenkel was dismissed from his positions at the University of Breslau. In 1936, he emigrated to Uruguay where he became a scientific advisor to the government. For the next 2 decades connections between him and Germany ceased. Later, the 'German Society of Gynecology and Obstetrics' offered an apology and awarded him Honorary Membership in 1951. He died on 7 July 1951 in Bad Ischl (Austria).

Collaborators to Ludwig Fraenkel: Erich Fels and Karl-Heinrich Slotta

Erich Fels and Karl-Heinrich Slotta were close collaborators of Fraenkel's in Breslau and contributed widely to the research on the function of the Corpus luteum [15]. In 1934, they succeeded together with H. Ruschig [8, 74, 75] in the isolation and identification of the Corpus luteum hormone (luteosterone → progesterone). Its structure was shortly afterwards elucidated by E. Fernholz (1934). Fels, Slotta, and Fernholz all had to leave



Erich (Erico) Fels (1897–1981)

Karl Heinrich Slotta (1895–1897), Chemist, collaborator of Fraenkel and Fels, son-in law of Ludwig Fraenkel

Germany and thus shared the fate of other Jewish scientists [8].

References

1. Adler L (1912) Zur Physiologie und Pathologie der Ovarialfunktion. Arch Gynäkol 95:349–424
2. Adler L (1919) Die Radiumbehandlung maligner Tumoren in der Gynäkologie. Strahlen Ther (suppl 4)
3. Adler L (1927) Fritz Hitschmann—obituary. Monatsschr. Geburtsh Gynäkol 76:478–482
4. Aschheim S, Zondek B (1928a) Die Schwangerschaftsdiagnose aus dem Harn durch Nachweis des Hypophysenvorderlappenhormons. I. Grundlagen und Technik der Methode. Klin Wschr 7:1404–1411
5. Aschheim S, Zondek B (1928b) Die Schwangerschaftsdiagnose aus dem Harn durch Nachweis des Hypophysenvorderlappenhormons. III. Praktische und theoretische Ergebnisse aus den Harnuntersuchungen. Klin Wschr 7:1453–1457
6. Aschheim S (1931): Experimentelle Grundlagen der Therapie mit Ovarialhormonen und Hypophysenvorderlappenhormonen in der Gynäkologie. In: Wolff-Eisner (ed) Handbuch der Experimentellen Therapie, München.
7. Baader G (1984): Politisch motivierte Emigration deutscher Ärzte. Ber Z Wiss Gesch 7:67–84
8. Bettendorf G (eds) (1994) Zur Geschichte der Endokrinologie und Reproduktionsmedizin. Springer, Berlin Heidelberg New York
9. Bruntzel R (1879) Sechs Fälle von Exstirpation des Uterus ''nach Freund''. Arch Gynäkol 14:245–270
10. Cohen E (1998) The nazification of German Physicians 1918–1937. Annals (R Coll Phys Surg Can) 31:336–340
11. Cushing H (1940) The Life of Sir William Osler. Oxford University Press, London, pp 214–215
12. Czerny V (1879) Eine neue Methode der Exstirpation des Uterus. Arch Gynäkol 14:430–437
13. Dallenbach-Hellweg G, Schmidt D (2001) History of gynecological pathology. X. Dr. Robert Meyer. Int J Gynecol Pathol 20:289–308
14. Dubovsky H (1989) The Jewish contributions to medicine. Part II. The 19th and 20th centuries. SAMJ 76:67–70
15. Fels E, Slotta KH (1931) Das rein dargestellte Hormon des Corpus luteum und seine biologischen Wirkungen. Klin Wschr 10:639
16. Fischer I.: Historischer Rückblick über die Leistungen des XIX. Jahrhunderts auf dem Gebiete der Geburtshilfe und Gynäkologie. In: Biologie und Pathologie des Weibes
17. Fraenkel L (1901) Versuch über den Einfluss der Ovarien auf die Insertion des Eies. Verh Dt Ges Gynäkol 9:571
18. Fraenkel L, Cohn F (1901) Experimentelle Untersuchungen über den Einfluss des Corpus luteum auf die Insertion des Eies. Anat Anz 20: 294
19. Fraenkel L (1903) Die Function des Corpus luteum. Arch Gynäkol 68:438–545
20. Fraenkel L (1910) Neue Experimente zur Function des Corpus luteum. Arch Gynäkol 91:705–761
21. Fraenkel L (1931) Sterilisation und Konzeptionsverhütung. Arch Gynäkol 144:86–132
22. Franke A, Franke K (1993) Jüdische Ärzte in Berlin. Z ärztl Fortbild 87:347–351
23. Frankenthal K (1981) Der dreifache Fluch: Jüdin, Intellektuelle, Sozialistin. In: Kathleen M, Pearle P, Stephan L (eds) Lebenserinnerungen einer Ärztin in Deutschland und im Exil. Frankfurt/M, New York
24. Frankl O (1927) Fritz Hitschmann (Obituary). Zbl Gynäkol 51: 514–516
25. Freund WA (1878) Eine neue Methode der Exstirpation des ganzen Uterus. Sammlung klinischer Vorträge in Verbindung mit deutschen Klinikern Nr. 41. Hrsg.: Volkmann, R. Leipzig: Breitkopf & Härtel pp 911–924
26. Freund WA (1913) Leben und Arbeit. Springer, Berlin Heidelberg New York
27. Göretzlehner RK (1978) Vor 50 Jahren—1927—erster Nachweis von Choriongonadotropin im Schwangerenharn durch Aschheim und Zondek. Zbl Gynäkol 100:638–641
28. Graefenberg E (1929) Die intrauterine Methode der Konzeptionsverhütung. In: Haire N (eds) Sexual reform congress. Kegan, Trench Trubner, London
29. Graefenberg, E (1931) Einfluss der intrauterinen Konzeptionsverhütung auf die Schleimhaut. Arch Gynäkol 144:345
30. Heinz G, Ebert A, Goetze B (1994) Der Exodus: Robert Meyer, Selmar Aschheim und Bernhard Zondek. Drei Namen für Tausende. In: Ebert A, Weitzel HK (eds) Die Berliner Gesellschaft für Geburtshilfe und Gynäkologie 1844–1994. Berlin–New York 1994, pp 206–242
31. Hitschmann F, Adler L (1908a) Der Bau der Uterusschleimhaut des geschlechtsreifen Weibes mit besonderer Berücksichtigung der Menstruation. Monatschr Gebh Gynäkol 27:1–82
32. Hitschmann F, Adler L (1908b) Gestaltwandel des endometrialen Drüsenepithels im Zyklus. Monatschr Geburtsh Gynäkol 27:1–8
33. Hitschmann F, Adler L (1913) Ein weiterer Beitrag zur Kenntnis der normalen und entzündlichen Uterusmucosa. Die Klinik der Endometritis mit besonderer Berücksichtigung der unregelmässigen Gebärmutterblutungen. Arch Gynäkol 100:233–304
34. Hubenstorf M (1987) Österreichische Ärzteemigration. In: Friedrich Stadler (eds) Vertriebene Vernunfts Emigration und Exil österreichischer Wissenschaftler 1930–1940. Wien, München, p 360
35. International Biographical Dictionary of Central European Emigrés (1933–1945) In: Strauss HA (ed) A-K, The arts, sciences, and literature, vol II/part 1 Röder, München-New York-London-Paris, 1983, p 37.
36.. Kaiser W, Völker A (1989) Die Geschichte der Halleschen Ars medica Judaica. Z gesamte Inn Med 4:25–30, 120–125, 241–246, 274–280, 426–432
37. Kaiser W (1994) Jüdische Mediziner in den wissenschaftlichen Vereinigungen 1900–1945. Z ärztl Fortbild 87:247–252
38. Kaiser W (1993) Jüdische Mediziner in den wissenschaftlichen Vereinigungen des 18 und 19 Jahrhunderts. Z ärztl Fortbild 87:687–692
39. Kaiser W (1971) L'enseignement médical et les juifs à l'université de Halle au 18ème siècle. Rev Hist Md Hebr 24:23–25, 107–110.
40. Kater MH (1989) Doctors under Hitler IX-XII. University of North Carolina Press, Chapel Hill
41. Kater MH (1986) The Nazi physicians' league of 1929: causes and consequences. In: Childers T (ed) The formation of the Nazi constituency 1919–1933. Barnes and Noble, London, pp 147–181
42. Kater MH (1992) Unresolved questions of German medicine and medical history in past and present. Cent Eur Hist 25:407–23
43. Kehrer E (1937) Endokrinologie für den Frauenarzt. Ferdinand Enke Verlag, Stuttgart
44. Knobloch H (1980) Herr Moses in Berlin. Buchverlag Der Morgen, Berlin, 2.Aufl
45. Kohler ED (1991) German physicians in the Nazi era. Cent Eur Hist 24:325–334
46. Kröner HP (1989) Die Emigration deutschsprachiger Mediziner 1933–45. In: Berichte zur Wissenschaftsgeschichte/ Sonderheft, VCH Acta humaniora.

47. Kümmel WF (1985) Die Ausschaltung rassisch und politisch missliebiger Ärzte. In: Fridolf Kudlien (ed) Ärzte im Nationalsozialismus. Köln, p 70, 79
48. Kuzka E (1958) In memoriam Professor Ludwig Adler. Med Circle Bull 8:6–7
49. Leibfried S, Tennstedt F (1980) Berufsverbote und Sozialpolitik 1933. Bremen.
50. Leibfried S (1982) Stationen der Abwehr Berufsverbote für Ärzte im Deutschen Reich 1933–1938 und die Zerstörung des sozialen Asyls durch die organisierten Ärzteschaften des Auslandes. LBI Bulletin 62:5
51. Loebker C (1879) Bericht über die in der gynäkologischen Klinik zu Greifswald ausgeführten Laparatomien. Arch Gynäkol 14:438–471
52. Ludwig H (1986) Zur Gründung der Deutschen Gesellschaft für Gynäkologie. In: Beck L.(eds) Zur Geschichte der Gynäkologie und Geburtshilfe. Springer, Berlin Heidelberg New York, pp 9–26
53. Ludwig H (1999) Die Reden. Springer, Berlin Heidelberg New York
54. Ludwig H (2002) Vom Programm zur Botschaft. Dt Ges Gynäkol Gebh
55. Ludwig H (2003) Zur Entstehung unseres Wisssens vom Zyklus. Gynäkologe 36:723–725
56. Ludwig H (2004) Ludwig Fraenkel: Das Corpus luteum ist eine Drüse innerer Sekretion. Gynäkologe 37:556–558
57. Mackenrodt A (1894) Beitrag zur Verbesserung der Dauerresultate der Totalexstirpation bei Carcinoma uteri. Z Geburtsh 39:157–170
58. Meyer R (1903) Über adenomatöse Schleimhautwucherungen in der Uterus und Tubenwand und ihre pathologisch-anatomsiche Bedeutung. Virchows Archiv 172:394–409
59. Meyer R (1910a) Die Epithelentwickloung der Cervix und Portio vaginalis uteri und die Pseudoerosio congenita (congenitales histologisches Ektropium) Arch Gynäkol 71:221–320
60. Meyer R (1910b) Die Erosion und Pseudoerosion der Erwachsenen. Arch Gynäkol 91:579–598
61. Meyer R (1912) Zur Kennntis der normalen und abnormalen embryonalen Gewebseinschlüsse und ihrer pathologischen Bedeutung. Z Geburth Gynäkol 71: 221–320
62. Meyer R, Kitai I (1924) Bemerkungen über endometrane Adenomyosis uteri in anatomischer Beziehung und insbesondere über die histologische Wirkung der heterotopen Zellwucherung, mit kurzer Bemerkung zur Theorie von Sampson. Zbl Gynäkol 48:2449–2460
63. Meyer R (1924a) Zur Frage der heterotopen Epirthelwucherung, insbesondere des Peritonealepithels und in den Ovarien. Virchows Archiv 250:595–610
64. Meyer R(1924b) Lipoide und Ovarialfunktion. Kritische Bemerkungen. Zbl Gynäkol 48:1570–1575
65. Meyer R (1925a) Pathologische Hypertrophie der Uterusschleimhaut im Gefolge von Ovarialtumoren, insbesondere in der Menopause. Zbl Gynäkol 49:1662–1667
66. Meyer R (1925b) Über den Zusammenhang der ovariellen und uterinen Funktion, unter besonderer Berücksichtigung des aus jungen Schwangerschaften sich ergebenden Ovulationstermins beim Menschen. Zbl Gynäk 49:1345–1347
67. Meyer R (1937) Zusammenfassende Bemerkungen über die Entwicklung des distalen Endes des Vagina und des Hymens beim Menschen; ein Beitrag zur konstitutionellen Embryologie. Zbl Gynäkol 61:2846–2865
68. Nachmansohn D (1979) German-Jewish pioneers in science 1900–1933. Springer, Berlin Heidelberg New York, p 166, 342
69. Procter RN (1988) Racial hygiene: medicine under the Nazis. Harvard University Press, Cambridge
70. Richarz M (1982) Selbstzeugnisse zur Sozialgeschichte 1918–1945. In: Jüdisches Leben in Deutschland, vol 3, Stuttgart, p 24
71. Ruge C, II (1913) Über Ovulation, Corpus luteum und Menstruation. Arch Gynäkol 100:20–48
72. Shulamit V (1987): Soziale Ursachen des Erfolgs in der Wissenschaft. Juden im Kaiserreich. In: Historische Zeitschrift 245: 315–342
73. Simmer HH (1986) Gynäkologische Endokrinologie in den Verhandlungen der Deutschen Gesellschaft für Gynäkologie 1886–1935 – Beiträge deutschsprachiger Frauenärzte. In: Beck L (ed) Zur Geschichte der Gynäkologie und Geburtshilfe Berlin. Springer, Berlin Heidelberg New York
74. Slotta KH, Ruschig H, Fels E (1934) Reindarstellung der Hormone aus dem Corpus luteum (vorläufige Mitteilung) Ber Dt Chem Ges 67: 1270–1273
75. Slotta K H, Ruschig H, Fels E (1934) Reindarstellung der Hormone aus dem Corpus luteum (II. Mitteilung). Ber Dt Chem Ges 67:1624–1626
76. Statistik des Deutschen Reiches (1934) Berlin, 455 p 26
77. Stoeckel W (1966) Erinnerungen eines Frauenarztes. Hrsg.: H. Borgelt, Kindler Verlag München, pp 247–248, 435–436
78. Strassmann PF (1903) Die künstliche Lösung der Placenta. In: Winckel's Handbuch der Geburtshilfe, vol 3, Wiesbaden; Strassmann PF (1906) Z Geburtsh 57:274
79. Strassmann PF (1931) Arznei-, diätetische, diagnostische und sozialhygienische Verordnungen für die gynäkologisch-geburtshilfliche Praxis. 5. Aufl., G. Thieme, Leipzig.
80. Strassmann PF (1913) Gesundheitspflege des Weibes. Wissenschaft und Bildung, vol 111. Quelle & Meyer, Leipzig
81. Universitätsarchiv der Humboldt Universität Berlin, Medizinische Fakultät, Nr. 1357, Habilitationen (1922–24), Bl. 206b
82. Weindling P (1989) Health, race and German politics between national unification and Nazism. 1870–1945. Cambridge, Cambridge University Press
83. Wilson LG (1989) Medical revolution in Minnesota: a history of the University of Minnesota Medical School. Midwin, St.Paul, p 353
84. Zander J (1986) Milestones in gynecology and obstetrics. In: Ludwig H, Thomsen K (eds) Gynecology and obstetrics, Proceedings of XIth world congress of gynecology and obstetrics. Springer, Berlin Heidelberg New York, pp 3–24
85. Zondek B, Aschheim S (1926a) Über die Funktion des Ovariums. Z Geburth Gynäkol 90:372–380
86. Zondek B, Aschheim S (1926b): Das Hormon des Hypophysenvorderlappens. Testobjekt zum Nachweis des Hormons. Klin Wschr 6:248
87. Zondek B, Aschheim S (1928) Das Hormon des Hypophysenvorderlappens. Darstellung, chemische Eigenschaften, biologische Wirkungen. Klin Wschr 7:831–835
88. Zondek B (1930) Über die Hormone des Hypophysenvorderlappens. Klin Wschr 9:245–248
89. Zondek B (1931) Hypophysenvorderlappen. Arch Gynäkol 144:133–164
90. Zondek B (1933) Z Geburtsh Gynäkol 105:486–509
91. Zondek B (1933) Z Geburtsh Gynäkol 105:509–512
92. Zondek B (1934) Z Geburtsh Gynäkol 107:397
93. Zondek B (1934) Z Geburtsh Gynäkol 108:162–182
94. Zondek B (1934) Z Geburtsh Gynäkol 108:393–407
95. Zondek B (1936) Z Geburtsh Gynäkol 112:256–272
96. Zondek B (1939) Z Geburtsh Gynäkol 118:200–202
97. Zondek B (1939) Z Geburtsh Gynäkol 118:511
98. Zondek B (1940) Z Geburtsh Gynäkol 121:146–159
99. Zondek B (1941) Z Geburtsh Gynäkol 122:435–438
100. Zondek B (1942) Z Geburtsh Gynäkol 123:363–366
101. Zondek B (1942) Z Geburtsh Gynäkol 124:214–222. This report appeared more extensively under the title "Schreckblutung aus der Gebärmutterschleimhaut" Zbl Gynäkol (1943) 67:866–877