Professor Bernhard Pollack (1865–1928) of Friedrich Wilhelm University, Berlin: Neurohistologist, Ophthalmologist, Pianist

Lazaros C. Triarhou

University of Macedonia, Thessaloniki, Greece

Key Words

Berlin Doctors' Orchestra • Histological staining methods • Moritz Moszkowski • Artist-physicians • Paul Silex • University of Berlin • Carl Weigert

Abstract

This article highlights the life and work of Bernhard Pollack (1865–1928), a pioneer neurohistologist, ophthalmologist, and world-class pianist. In 1897, Pollack published the first standard manual on staining methods for the nervous system. Born into a Prussian-Jewish family, he received his piano education from the composer Moritz Moszkowski and his pathology education from Carl Weigert. Pollack worked in the Institutes of Wilhelm Waldeyer (anatomy), Emanuel Mendel (neuropsychiatry), the later Nobel laureate Robert Koch (infectious diseases), and the Eye Policlinic of Paul Silex (ophthalmology), becoming a Professor of Ophthalmology at Berlin's *Friedrich-Wilhelms-Universität* in 1919. The study also chronicles the founding by Pollack of the Berlin Doctors' Orchestra in 1911.

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ever, appears to be the role individual personalities have played in the history of sciences. The qualities and performances of these outstanding individuals have promoted scientific knowledge and life' [1].

Despite a substantial modern corpus on the history of European neurology, gaps and inconsistencies remain, stemming in part from the disappearance of the permanent records of 'non-Aryan' professors in German universities during the Third Reich. Pieces of the puzzle therefore have to be pieced together indirectly from bibliographic and other sources.

Such seems to be the case with Bernhard Pollack (fig. 1), one of the most esteemed *Künstlerärzte* (artist-physicians) in pre-war Berlin, remembered by peers and socialites as a distinguished ophthalmologist, splendid pianist, and kindhearted genius [2]. He authored one of the earliest manuals on histological staining methods for studying the brain, published by Karger in the 1890s [3].

The present article details Pollack's medical and artistic endeavors, as well as his founding of the *Berliner Ärzte-Orchester* (Berlin Doctors' Orchestra) in 1911.

Family and Academic Life

Biographical resources for Bernhard Pollack are scanty [2, 4, 5] and at times incongruous [6, 7]. Kreuter [6] mentions 'Bernhard Pollack (1888–1929)' as a neurologist and attributes to him a 1888 paper on 'A case of hysterioepi-

In his account of the foundations of neuroscience in Vienna, the neuropathologist Franz Seitelberger (1916–2007) wrote: 'Modern writers seem to be most interested in the economic, social and political circumstances of scientific progress. Not the least important condition, how-

Fig. 1. Editorial board of the inaugural issue of ‘Annual Report on Accomplishments and Progress in the Fields of Neurology and Psychiatry’ (left). The names of Vladimir M. Bekhterev (1857–1927), Max Bielschowsky (1869–1940), Sigmund Freud (1856–1939), Ludwig Jacobsohn (1863–1941), Emanuel Mendel (1839–1907), Lazar S. Minor (1855–1942), Heinrich Obersteiner (1847–1922), Arnold Pick (1851–1924), Paul Silex (1858–1929) and Theodor Ziehen (1862–1950) appear alongside with those of the four gentlemen shown in the right photo (taken in 1901 in Berlin).

Left to right: neuropathologist Siegfried Kalischer (1862–1954) (‘Sturge-Kalischer syndrome’), neurologist Edward Flatau (1868–1932) (‘Redlich-Flatau disease’ and ‘Flatau-Sterling syndrome’), neuroanatomist Ludwig Jacobsohn (1863–1941) (‘Bekhterev-Jacobsohn reflex’), and Bernhard Pollack, seated. Credit: Wikimedia Commons; photo traced by Eisenberg [65] in the Berta Lask Archive of the Berlin Academy of Arts. Pollack’s signature digitally etched from personal copy of Flatau’s *Atlas* (author’s archive).

lepsy in a man’ [8], which was actually authored by Julius Pollack – an associate of psychiatrist Károly Laufenauer and neuropathologist Friedrich von Korányi of Budapest. The publication year of that paper [8] and of Pollack’s last paper [9] could well explain the erroneous dates (they imply that Pollack received his doctorate at the age of 5, and published his book on staining methods at the age of 9). Elsewhere, Pollack was described as a ‘Viennese neuro-anatomist’ [7] rather than a Berlin ophthalmologist [5]. There was also a Bernhard Pollack von Parnau (1847–1911) in Vienna, an industrialist-financier and art collector, known for his philanthropism [10].

Bernhard Pollack was born on August 14, 1865, into a Jewish family [4, 5]. He had two elder brothers, Joseph and Paul, and two sisters, Clara Lichtheim (née Pollack) [11], who was the mother of the political activist and author Richard Lichtheim (1885–1963), and Betty Friedmann (née Pollack), who was later murdered at Auschwitz, along with her daughter and son-in-law, when she was over 80 years old [4].

Clara Pollack-Lichtheim’s father-in-law, Health Councilor (*Sanitätsrat*) Heinrich Lichtheim, was a cousin of Professor Ludwig Lichtheim (1845–1904) of the Universi-

ties of Bern and Königsberg; his Internal Medicine Department at Königsberg was an ‘oracle’ for Russian Jews, who traveled great distances to be treated [4]. Lichtheim, and the Prussian neuropathologist Carl Wernicke (1848–1905), formulated prevailing views on aphasia, later discussed by Freud in his *Critical Study* [12].

Pollack enjoyed a privileged education. He grew up in Berlin and studied medicine in Heidelberg [13], where he was particularly fond of the lectures of Professor Julius Arnold (1835–1915) (‘Arnold-Chiari malformation’).

After becoming a certified physician, Pollack pursued graduate studies in pathology at the University of Leipzig. He defended his doctoral dissertation ‘On Metastatic Lung Tumors’ (fig. 2) on April 17, 1893, during the period when Felix Victor Birch-Hirschfeld (1842–1899) was chairing the Pathology Department. Pollack’s thesis [13] was supervised by Carl Weigert. Weigert and Pollack studied vascular lesions in lung metastases from diverse primary carcinomas in autopsy material from 16 patients aged 30–79 years [13, 14].

Following his graduation, Pollack settled in Berlin and prepared ophthalmological specimens for the State Collection of Medical Instruction Aids [15]. He worked

at the Institutes of Wilhelm Waldeyer [16], Emanuel Mendel [17], and the later Nobel laureate Robert Koch [18], and the Eye Policlinic of Professor Paul Silex (1858–1929) [19–21], who, in 1914, had founded with the blind singer Betty Hirsch (1873–1957) the first school for the blind in Berlin. Silex attracted students from abroad, even from countries hostile to Germany as a result of World War I [22]. Pollack practiced as an *Oberarzt* (chief physician), kept a research laboratory [23], and attained a reputation as one of Silex's most distinguished colleagues [22]. Together they saw an estimated 300,000 eye patients over 30 years [9]. Pollack also collaborated with Max Bielschowsky [17, 24] and Edward Flatau [25], who described him as 'the man with the great work on the nervous system' (fig. 3).

Pollack was 'a man of life'; a gentleman of the old school, he hardly ever drank a glass of wine and always enjoyed good table conversation [4]. He was briefly married to the Viennese soubrette Fritz Massary, the Operetta's *Primadonna assoluta* of the Weimar Republic [26]. Massary left Pollack [4] and in 1917 married the actor Max Pallenberg. Being Jewish, Massary fled Germany in 1933 and eventually moved to California [27]. Bruno Walter treasured Massary's voice, casting her as 'Adele' in the Salzburg production of *Die Fledermaus* and in the title role in Bizet's *Carmen* [26]. A street is named after her in Berlin (Fritzi-Massary-Strasse, zip code 12057, for the interested reader).

Pollack lived in one of the most fashionable residential avenues, still remembered by old Berliners, not far away from Potsdamer Platz and the old Philharmonie [28]. In 1906, he moved from Linkstrasse 41 to Blumeshof 15 in Lützow. In 1912, Pollack remarried, to the Viennese Baronin Marie Elisabeth (Miky) Popper von Podhrágy, daughter of Berthold Popper von Podhrágy and Katharina (née Löwenstein).

Pollack's father-in-law Berthold was born in Kotessó (Kotešová), Slovakia, the seventh of eight children. He had inherited a respectable sum from his father and worked in the timber trade with his younger brother Armin Freiherr Popper von Podhrágy, who held a Doctorate in Philosophy from the University of Freiburg [29, 30].

In 1910, Berlin's *Friedrich-Wilhelms-Universität* marked its centennial, Rector Emil Fischer welcoming the Emperor and his wife to the festivities. In 1919, Pollack became Professor of Ophthalmology while Julius Hirschberg (1843–1925), the noted medical historian, was chair of the Ophthalmology Department [31].

Fig. 2. Pollack's 47-page doctoral dissertation [13] (courtesy of Bibliotheca Albertina, Universität Leipzig). The acknowledgments read (my translation): 'In closing, I take the liberty to express my heartfelt gratitude to Professor Weigert for the gracious kind loan of the material and for his kind support in the preparation of this work. Likewise, let me offer my sincere thanks to Councilor Arnold, whose special instruction and guidance I had the opportunity to enjoy during my student years in Heidelberg'. Copying, redistribution or retransmission without the author's express written permission is prohibited.

Staining Methods for the Nervous System

Within the first few years of founding his Publishing House in Berlin, Samuel Karger solicited young but acknowledged scholars to write state-of-the-art compendia, surveying important fields of medicine for the practicing physician [32–34].

The compendium produced by Pollack [3] was part of that series. Considered to be the first of its kind [35], it was intended as a convenient reference for the neurologist and assumed some theoretical and practical knowledge of microscopic technique. Pollack dedicated it to Waldeyer and Weigert. A second, enlarged edition was written within 9 months [36], and a third 6 years later [37] (fig. 4). Specific instructions covered most neurohistological methods known at the time, with special emphasis on stains [35], accompanied by a comprehensive bibliography of 40 references, expanded to 100 in the second, and

Fig. 3. Flatau's handwritten dedications of his 1894/1899 'Atlas of the Human Brain' [41] to Pollack in Italian and in French. The inscriptions read: 'To my dearest doctor Bernhard Pollack. The Author, Berlin' (left) and 'To my dear friend Dr. B. Pollack (the man with the great work on the nervous system). E.F.' (right). Author's library. Copying, redistribution or retransmission without the author's express written permission is prohibited.

Fig. 4. The three German editions of Pollack's compendium [3, 36, 37]. Credits: Staatsbibliothek zu Berlin Preussischer Kulturbesitz (left); author's library (middle and right). Copying, redistribution or retransmission without the author's express written permission is prohibited.

300 in the third edition. The second edition was translated into English, French and Russian, and the third into Italian [37–39].

The book was structured in five parts: (1) removal of the brain, dissection of the central and peripheral nervous system, macroscopic examination, and conservation for museum purposes; (2) fixation, embedding, sectioning, and microscopic technique; (3) changes in brain weight depending on fixative, micrographic and photographic documentation; (4) methods of staining the main elements of the nervous tissue, i.e. neurons, myelin, axons and glia; and (5) general remarks and practical suggestions on choice of technique for normal or pathological neurohistology.

A few years earlier, Waldeyer [40] had coined the term ‘neuron’ and supported the theory of Ramón y Cajal on the autonomy of nerve cells as structural and functional units of the nervous system. Working in Waldeyer’s Institute, Pollack commanded the chemical basis of each staining method and went over the postulates of fixation for improving microscopic specimens. He described the methods of Ehrlich, Nissl, Weigert, Golgi, Cajal, Marchi, Flechsig, Freud, Nansen, von Lenhossék, Frey, Roncoroni, and Azoulay, among others, and covered the macrophotographic methods developed by Flatau, who had published his ‘Atlas of the Human Brain’ [41, 42] 3 years earlier (fig. 3).

The separate chapter on the structure of nerve cells in the retina of vertebrates [36, 38] and a subsequent study on the innervation of the mammalian eye [17] were early comprehensive and groundbreaking works on staining methods applied to ocular microscopy.

Pollack received a positive review from Theodor Ziehen, who commented that the book ‘meets an urgent necessity in an excellent manner with its detailed coverage’ [43].

The book’s merits were praised by the *British Medical Journal* [44]. The review of the first German edition stated: ‘The author has wisely adopted the method so successfully used in Kahlden’s *Histologische Technik*, of giving a summary in most cases of how the method is precisely carried out ... This book will no doubt prove of much service to those interested in the subject, and can be thoroughly recommended’. The review of the second German edition commented:

‘The call for a second edition of this little book within 12 months of its first appearance is sufficient evidence of its value. The author has increased this value in the new edition by some judicious omissions and additions. The method of preserving the brain for museum purposes by a 2% solution of formalin in glyc-

erine, as suggested by Laskowski, is a wise addition to the older methods ... The value of the book is greatly increased by the list of references appended, and the author has brought this thoroughly up to date. The book is excellent, and we venture to think it will have a wide circulation.’

Of the third German edition, the reviewer wrote: ‘This book is up to date and trustworthy. An important feature is that the writer distinguishes between the methods he considers of first importance and those of second-rate value. We have no hesitation in again recommending Dr. Pollack’s handbook in its latest edition’.

Alfred W. Campbell, the cortical cytoarchitectonics pioneer, found the third edition [45] a useful companion to the general histology *vade mecum* of Arthur Bolles Lee [46, 47], which had been published in March 1885 and seen six editions by June 1905 (chapters 31–35, or 65 pages, were devoted to the nervous system). Campbell [45] remarked that Pollack’s running commentaries on each staining procedure were full of sound suggestions and proved the author to be a ‘thoughtful, accomplished, and well-practised microscopist’.

Of the English edition, the *British Medical Journal* [44] wrote:

‘The author has increased the value of his book by some omissions and several useful additions, notably a chapter on the retina, set forth with admirable clearness. To those who are working at the histology of the nervous system some of the newer methods added in this edition will probably be of value, and no doubt to English readers the English edition will be a boon.’

The review of the French version observed [44]:

‘The needs of a handbook of neurohistological technique giving useful and practical methods have been met by the publication of Dr. Pollack’s work. Methods are clearly detailed. The general remarks on methods and processes are suggestive and full of information, and an up-to-date bibliography is appended. The present edition will be welcome, it shows clearness of topography and of meaning, and the little work has merits of a decided and practical character.’

The French translation [39] was prompted by the international success of the manual, according to Professor Pierre-Émile Launois of Paris, who emphasized the revolution witnessed over the preceding 25 years in the knowledge on the structure of nerve and glial cells and their histophysiological relationships in health and disease, largely owing to the perfection of microscopes, and fixation and staining techniques. Golgi published his breakthrough discovery of the potassium dichromate-silver nitrate method in 1873, Cajal putting it to full use from 1888 onwards; in 1886, Ehrlich discovered that nervous elements could be colored after intravenous injections of

methylene blue; Nissl, Marchi and Weigert registered equally important advances, and Flechsig was deciphering brain ontogeny by studying myelination. All that knowledge was used by Waldeyer [40] to systematize the 'neuron theory', which further explained secondary degenerative phenomena reported by Charcot, von Monakow, von Gudden and others. Launois argued that Pollack's comprehensive and practical book, with its orderliness, precision and clarity, would lead to scientific progress through the betterment of research methods.

As Pollack was finalizing the third edition, word arrived of the death of Weigert. Pollack wrote in the foreword [37]:

'Carl Weigert, the man who was a mentor to all of us, has eternal merits especially in our field of neurological research, as in so many other sectors. There is a profound need to extend to this man, beyond the grave, my deepest thanks from the heart for all he has always accorded me from a scientific, as well as a purely human perspective.'

Scientific Papers

Pollack carried out experimental and clinical studies in brain and eye research in addition to practicing ophthalmology. His first published article, based on research carried out in Waldeyer's Anatomical Institute, was 'Some remarks on neuroglia and neuroglia staining' [16]. Pollack reviewed the modifications of the Weigert and the Golgi-Cajal impregnation methods and their relative merits for studying the human and animal nervous system under normal and pathological conditions. He discussed the debate between Golgi, Cajal and most anatomists, who attributed nervous-like functions to neuroglia, against the views of Weigert and Ranvier, who absolutely rejected such a role.

Soon after the *Bacillus botulinus* was discovered, Kempner and Pollack [18], working at Koch's Institute for Infectious Diseases, were among the first, along with Marinesco [48], to study neuron lesions in cranial and spinal motor nuclei after experimental botulinum intoxication [49]. The clinical picture did not parallel the severity of the histopathological findings. Kempner and Pollack [18] found an early stage of cytoplasmic degeneration that they described as a 'clumpy swelling' of cell granules, but no evidence of glia proliferation; they further noted that in cases in which a lethal dose was administered that was sufficient to kill an animal in 48 h, its life could be saved if it received antitoxin within 24 h. In any event, neuronal lesions persisted 2 weeks later and disappeared very slowly.

Evidently, cells were damaged for a long time after the disappearance of the clinical signs, and there was a discrepancy between lesion severity and clinical picture [50, 51]. Dickson [50] credits the work of Kempner and Pollack [18] as the only record of *B. botulinus* being isolated from nature, having recovered a strain from the intestinal contents of a normal hog.

In tuberculous panophthalmitis, Pollack [20] found that the inner layers of the sclera are stained blue instead of red by hematoxylin (metachromasia) and considered such a reaction typical, owing to degeneration, with mucin playing a possible role.

Working at Silex's clinic, Kurzezung and Pollack [19] presented a case to the Berlin Ophthalmological Society on July 16, 1903, considered unique in the literature at the time, of a primary tumor of the optic disc in a 21-year-old man (fig. 5). The ophthalmoscopic examination revealed a shiny reddish-yellow growth on the right side, sharply protruding by about 1 mm from the fundus into the vitreous humor; it was rich in capillaries, had a cauliflower-like shape with a blue-gray margin pigment, and a diameter double that of the disc. Right vision was 5/50 with a central 10–20° scotoma. Since the growth did not change 6 months after intensive mercury and potassium iodide treatment, it was interpreted as a neurofibroma or myxosarcoma of childhood origin.

Waterman and Pollack [21] published the case of a railroad worker with an injury to the upper left orbital region that led to visual impairment, striking personality changes, and a belated atrophy of the optic nerves, which the authors attributed to a contre-coup fracture of the base of the skull (fig. 5). Additional signs resulted from damage to the cranial nerves, including left anosmia, anacusia, trigeminal paresis; motor and sensory disturbances were noted on the left side of the body.

Working in Mendel's laboratory, Bielschowsky and Pollack [24] presented histological results (Berlin Society for Psychiatry and Nervous Diseases, session of June 9, 1896) applying the Weigert glia method to study the spinal cord, medulla and optic chiasm; in the same session, Pollack described glial preparations of the optic nerve and spinal cord [52]. Six years later, Bielschowsky and Pollack [17] published a paper on the innervation of the retina, optic nerve, iris and cornea in the rabbit, dog, horse and human, using a silver-impregnation modification of Bielschowsky's fiber method with success; in line with Cajal [53], they refuted the interpretation of Embden [54] which favored the reticular theory regarding the horizontal cells of the retina, viewing them as discrete neuron entities instead [55].

Fig. 5. Case reports of a primary tumor of the optic disc [19] (upper left) and of a head injury with visual impairment [21] (lower left). Pollack's final paper [9] (right), the posthumously published chapter in the *Festschrift* for Flatau (courtesy of Ruth Lilly Medical Library, Indiana University).

In an essay titled 'Costless eye examination' [56], Pollack warned about the perils of relying on opticians for free eye examinations instead of visiting the ophthalmologist. He stressed the value of ophthalmoscopy, as well as the timely diagnosis of glaucoma, retinal detachment, diabetic complications, kidney disease, cerebrospinal degeneration, internal hemorrhage and tumors. From the several hundred opticians operating in Berlin, to his knowledge, only three or four consulted an ophthalmologist. Pollack proposed a mandatory prescription for glasses by a physician and described the abuse of eye glasses (especially brand names) by crooks to treat anything from insomnia and obesity to diabetes and hemorrhoids; they charged anything up to 200 marks. He mentions the case of a young girl suffering from a gonorrheal eye infection, who lost her sight, following a hocus-pocus treatment by a local char-

latan, who turned out to be mentally ill. Pollack came down hard on Christian 'science' imported from America, which he said shamed scientific knowledge.

Pollack's last paper [9] is a chapter on an optic nerve gliosarcoma in a woman, with macroscopic and histological finds, which appeared posthumously in the *Festschrift* for Flatau (fig. 5).

Conferences and Editorial Activities

Pollack presented cases to the Berlin Ophthalmological Society on ocular filariasis [57, 58], optic nerve glioma in a 20-year-old woman [59], spindle cell sarcoma of the frontal sinus [60], metastatic choroidal carcinoma [61], and Mikulicz disease (Sjögren syndrome) [62].

In August 1897, Pollack attended the Twelfth International Congress for Internal Medicine in Moscow [63–65] and participated in the discussion on cellular pathology [63]. Attendants included prominent figures in international neurology and psychiatry, such as Richard von Krafft-Ebing, Heinrich Obersteiner, Hippolyte Bernheim, Lazar S. Minor, Alfred Goldscheider, Hermann Oppenheim, Arthur van Gehuchten, and Georges Marinesco [63, 64].

In September 1904, Pollack attended the Tenth International Congress of Ophthalmologists in Lucerne and summarized its proceedings [66].

Pollack served on the editorial board of the *Centralblatt für Praktische Augenheilkunde*, edited by Julius Hirschberg [31], and the *Jahresbericht über die Leistungen und Fortschritte auf dem Gebiete der Neurologie und Psychiatrie*, edited by E. Mendel and L. Jacobsohn [67], by contributing literature reviews on the staining and anatomical methods of neurological research [25, 68].

Between 1897 and 1909, Pollack wrote literature reviews on microscopic methods for the study of the nervous system for the *Monatsschrift für Psychiatrie und Neurologie* [69, 70] and compiled the proceedings of the Berlin Ophthalmological, Physiological, Medical and Psychiatric-Neurological Societies for the *Zeitschrift für Augenheilkunde*, currently *Ophthalmologica* [71, 72].

Musical Life

Besides being an established neuroanatomist and eye surgeon, Pollack was a pianist of the highest rank. He took piano lessons in the 1870s from the composer Moritz Moszkowski [73, 74], the enlightened music pedagogue who taught at the *Neue Akademie der Tonkunst* in Berlin between 1871 and 1896 [75]. In 1890, Pollack published a four-hand piano transcription of his teacher's *Second Suite for Orchestra*, op. 47 (fig. 6).

Pollack's elder brother Joseph, who died young in a railway accident [4], was also musically gifted. A brilliant pianist with an impressive memory, he had been accepted for piano audition by Franz Liszt. Moszkowski dedicated his *Gondoliera*, op. 41, to Joseph Pollack, and piano arrangements of the *Scherzo-Valse* and *Maurischer Marsch* from *Boabdil* – his opera on the capture of Granada – to Bernhard Pollack (fig. 7).

Bernhard Pollack could have been as good a pianist as a physician [4]. Following the death of his father Jakob, and having inherited a fortune of several hundred thousand marks, he hardly practiced medicine at all and in-

stead lived to indulge his musical inclinations. Only in later years, after using up much of the fortune, did he resume clinical practice.

Pollack had many artist friends, whom he frequently hosted. As a student, Lichtheim [4] spent time with his uncle Bernhard. In Pollack's bachelor dwelling – a rendez-vous of prominent figures from the music world – Lichtheim met Emil von Sauer, Moriz Rosenthal, Teresa Carreño, Josef Hofmann (to whom Moszkowski had dedicated his *Piano Concerto* in E major, op. 59, and Rachmaninoff his *Piano Concerto* in D minor, op. 30), and Fritz Kreisler (who had briefly studied medicine after being rejected by the Vienna Philharmonic, to return to the violin in 1899 with an acclaimed concert by the Berlin Philharmonic under conductor Arthur Nikisch).

The Hungarian violinist Joseph Szigeti recalls Pollack as his 'kindhearted pilot' and one of the finest chamber music pianists; they played together at salon style musicales in Berlin [2]. The young Dr. Pollack had anonymously accompanied Kreisler on one of the latter's early tours of the United States [2, 4]. Kreisler dedicated his violin and piano arrangement of Giuseppe Tartini's *Devil's Trille Sonata* in G minor to Pollack: 'Meinem lieben Freunde Dr. B. Pollack herzlichst zugeeignet' [76].

Leibbrand [77] mentions Pollack's masterly performance of a Beethoven piano concerto in Berlin. Lichtheim [4] recalls a concert by the Berlin Philharmonic, when his uncle Bernhard moved from the parquet to the podium after the performance by a famous cellist to accompany him at the piano encores that the public forced upon the soloist impromptu, even when the orchestra had left.

On March 8, 1897, Pollack [78] gave a lecture to the Berlin Society for Psychiatry and Nervous Diseases on 'Musical memory'. After briefly describing memory function in painters, mathematical geniuses and chess players, he moved on to the musical memory of musicians. The musician, he claimed, upon hearing a piece of music for the first time, recognizes its key (e.g. C minor or E-flat major) and visualizes the composition. Such a complex function, often impossible for the dilettante, enhances perception and explains the precision, ease and consistency of musicians' ability to reproduce a piece. Some people further experience *audition colorée*, a topic little investigated. Besides the ear, the musician quasi uses the eye to mentally visualize notes without actually seeing them. A third substantial element involves rhythm, the characteristic of primeval music (music and dance of the wild), which adds substance to any melody, from a simple waltz to an endless Wagnerian phrase.

Fig. 6. Moritz Moszkowski (1854–1925) (left). Photo by Foetisch Frères S.A., éditeurs, Lausanne (courtesy Lebrecht Music & Arts, London, reproduced with permission; signature from an autographed copy of *Études de Virtuosité*, op. 72, dated January 26, 1918, author's archive). Title page of Pollack's piano arrangement for four hands of the *Second Suite for Orchestra*, op. 47 (right), with dedication to Hans von Bülow (1830–1894), Professor of Piano at the Stern Conservatory and Principal Conductor of the Berlin Philharmonic from 1887 to 1893 [28]. Credit: Sibley Music Library, Eastman School of Music of the University of Rochester, New York. Copying, redistribution or retransmission without the author's express written permission is prohibited.

Fig. 7. Moszkowski's *Gondoliera* for piano, op. 41, dedicated by the composer to Pollack's brother Joseph (left); author's library. *Scherzo-Valse* and *Maurischer Marsch* ('Moorish March') from the opera *Boabdil*, op. 40, arranged for pianoforte concert performance and dedicated by the composer 'to his friend Bernhard

Pollack' (center and right). Courtesy of Chicago Public Library (*Scherzo-Valse*) and of Biblioteca del Conservatorio di Musica 'G. Verdi' di Milano (*Maurischer Marsch*). Copying, redistribution or retransmission without the author's express written permission is prohibited.

Pollack argued that experiments might help to better understand musical memory, citing Hermann Ebbinghaus and Emil Kraepelin. He revisited the problem of localization and the work of Hermann Oppenheim and Martin Bernhardt. With insight, Pollack suggested that the observed occurrence of amusia without aphasia excludes an identical localization of the corresponding cortical areas. In conclusion, Pollack mentioned the work published in Russian by Alexander N. Bernstein, who, on the basis of anatomical data on the sensory pathways of vision and olfaction, assumed the existence of a similar center for audition. Finally, he made reference to Friedrich Jolly, who contended that, in spite of neither having musical training nor knowing what C minor or E-flat major meant, he could nonetheless recite a simple melody [78].

In reviewing Rietsch's monograph on 'The Tone-Art in the Second Half of the 19th Century' – based on lectures at the University of Vienna – Pollack [79] expressed concern that the book was too technical and, although professionals would certainly appreciate its ascetic form, 'music, the most popular of all arts, should be accessible by a wider audience'.

The Berlin Doctors' Orchestra

The famous Berlin Philharmonic was founded by 54 musicians in 1882 [28]. In 1911, Pollack had the idea of forming an orchestra of 60 physicians with the talent and the courage to perform symphonic works [5, 80–83]. The *Berliner Ärzte-Orchester-Verein* was placed under the auspices of the Berlin Internal Medicine Association as a charitable ensemble.

The constitutive assembly convened on June 10, 1911, at the *Langenbeckhaus* in Berlin-Mitte. A temporary board was appointed, which extended an invitation for another assembly on October 11, 1911, at the *Kaiserin-Friedrich-Haus*. Heinrich Joachim, physician, medical historian and public officer in Berlin and Brandenburg, and a distinguished Egyptologist who had provided in 1890 the first commentary and translation of the Ebers papyrus, made the *Berliner Ärzte-Correspondenz* available as the official journal of the Orchestra Society [80].

In a board meeting on October 1, 1911, it was agreed to hold rehearsals from 9:15 to 11:00 p.m. on Tuesdays. The October 11, 1911, assembly elected a nine-member advisory committee. The conductors were to be Bernhard Pollack and Carl Weibgen and the concert-master Alfred Lewandowski. The first two rehearsals, with Pollack conducting, took place on October 24 and 31, 1911, at the

Kaiserin-Friedrich-Haus; the program comprised Haydn's *London Symphony* and Grieg's *Elegiac Melodies* [80].

Regular performances took place at the *Beethovensaal* of the old Berlin Philharmonic Hall (Köthener Strasse 32, Berlin-Kreuzberg), which had been built by the architect Ludwig Heim in 1898 with a seating capacity of 1,066. The proceeds benefited widows and orphans of deceased colleagues.

Thus, Berlin joined Vienna and Paris [81, 82] in having a Doctors' Orchestra. Heinrich Obersteiner, the founder of Vienna's Neurological Institute in 1882 [1] and a gifted musician, conducted the *Wiener Ärzte-Orchester* [84]. On a cheerful note, the Vienna Doctors' Orchestra once asked a famous singer to perform two arias with them. The tenor, skeptical about the physicians' talent, replied: 'Before I sing the arias with the Doctors Orchestra, I shall let my colleagues at the Vienna Philharmonic remove my appendix!' [85].

The apogee of the Berlin Doctors' Orchestra came in the 1920s, before the advent of radio and the record. In the setting of the old Philharmonie, a wide repertoire of works was performed with famous soloists. The example has been repeated internationally, such that a European Doctors' Orchestra was founded in 2004 and a World Doctors' Orchestra in 2007, apart from national Doctors' Orchestras in Switzerland, Spain, Romania, Finland, Australia, Japan, Taiwan and the United States.

The Composer Moszkowski

Pollack became a key figure in Berlin's artistic circles, closely associated with Hermann Wolff, the influential concert manager of the Berlin Philharmonic [86]. Until 1905, Pollack lived at Linkstrasse 41, next to the old Bechstein Hall, which was inaugurated in 1892 at Linkstrasse 42.

Moritz Moszkowski, Pollack's piano teacher (fig. 6), was a composer of refined music. A key figure in music history of the late nineteenth century, he has often been 'crowded' into a small paragraph, rather condescendingly, as a composer of 'salon' or 'genre' music [87]. He knew his orchestra as well as his piano, in fact. In his playing 'there was not attempt to astonish' and his elegant compositions are distinguished by graceful melodic veins and piquant rhythms [88]. Between the turn of the century and the outbreak of World War I, there was hardly a salon orchestra that did not perform the 'hit' *Spanish Dances*, and the *Virtuose Studies* became mandatory reading in Russian Conservatories.

In the 1880s, a neurological problem with Moszkowski's arm curtailed his career as a pianist, and he became increasingly devoted to composition [75, 89]. In 1884, he married Henriette Chaminade, the youngest sister of Cécile Chaminade; they had two children, Marcel and Sylvia. In 1890, Henriette left Moszkowski for the poet Ludwig Fulda, and a divorce was issued 2 years later. In 1897, Moszkowski moved to Paris. Henriette died in 1900. Moszkowski's own health deteriorated, and in 1906, he lost his 17-year-old daughter.

Yet Moszkowski never abandoned his wit. Noted for his *bon mots*, he once looked at the title page of a work by Raoul Gunsbourg that ran, *Ivan the Terrible, Opera by R. Gunsbourg*, and commented: 'It is a matter of a misplaced comma. It should read, *Ivan, the Terrible Opera by R. Gunsbourg*' [88]. Responding to a request by the German-American composer Ernst Perabo for an autobiography, he replied: '... I should be happy to send you my piano concerto but for two reasons: first, it is worthless; second, it is most convenient (the score being 400 pages long) for making my piano stool higher when I am engaged in studying better works ...' [90].

After World War I, Moszkowski was financially ruined, having invested all his capital in the crashing Austrian and German economies, and became seriously ill. Two former pupils came to the help of their ailing teacher: Josef Hofmann and Bernhard Pollack. Through Pollack's mediation in 1921, the Peters Publishing House in Leipzig offered a gift of 10,000 marks to Moszkowski, besides personal donations of 10,000 marks from Hofmann and 5,000 marks from Pollack. Pollack further sent piano arrangements of *Boabdil* to Peters, who supported the composer with an extra 10,000 francs, camouflaged as royalties [74].

A benefit concert for Moszkowski was given on December 21, 1921, in Carnegie Hall by 15 distinguished pianists, playing in ensemble under Walter Damrosch [91]. Among the artists were W. Backhaus, I. Friedmann, O. Gabrilowitsch, P. Grainger, J. Lhevinne and E. Ney. The concert netted 13,275 USD; one sum was transferred to the manager of the Paris branch of the National City Bank of New York with the instruction to use it for the needs of Moszkowski, and an annuity was purchased at Metropolitan Life Insurance Company, whereby the composer would receive 1,250 USD (or 15,000 francs) annually for the rest of his life, with the first monthly payment on March 1, 1925. On March 4, 1925, Moszkowski died in Paris of stomach cancer, in poverty and in comparative obscurity.

Ten days after his teacher's death, Pollack published the 'Recollections of Moritz Moszkowski' in a Berlin newspaper [73]. That article is a substantial testimony,

because, even today, few biographical essays exist on Moszkowski. In addition to an overview of Moszkowski's output, Pollack, as an insider, recounts several anecdotes that convey the composer's spirit. For example: '... Larger works soon followed, such as the *First Suite for Orchestra* in F major, a charming work from happier days. The *Suite* had become a sensational success in the mid-1880s and the joyous composer was repeatedly invited to conduct it in big cities in England and Germany. In those days, Moszkowski told with amusement how he would check into hotels as *Moszkowski with the Suite*' [73].

Conclusion

Pollack died on March 3, 1928, in the *Franziskus Krankenhaus* (St. Francis Hospital or *Vereinslazarett Franziskus-Sanatorium*, Burggrafenstrasse 1, Berlin), 3 years to the day after Moszkowski. His renown transcended continental Europe [92]. In the years that followed, Mrs. Pollack suffered hardship. When the National Socialists came to power, she fled to Paris in 1933. Apparently, Bernhard and Marie Elisabeth Pollack had a son, Hanns, who stayed in Berlin with friends [29, 30]. Richard Lichtheim, the two children of Pollack's brother Paul, and the grandchildren of Pollack's sister Betty were able to escape abroad [4].

Pollack left this world with Berlin in one piece. The events of 1938–1945 halted Europe's progress and led academic institutions to disaster. There is one regret that will always remain, apart from the bestial slaughter: the deprivation of humanity of an intellectual, cultural and scientific heritage that might have been.

Postscript

On Sunday, May 2, 2010, the *Berliner Ärzte-Orchester* gave their spring concert at the *Kammermusiksaal* of the Philharmonie in Berlin, performing Beethoven's *Fourth Piano Concerto* and Brahms's *Fourth Symphony*.

On the following morning, a rainy Monday, surmising that Pollack's burial site could be the *Jüdischer Friedhof* in Berlin-Weissensee, my brother and I took off for Herbert-Baum-Strasse 45. As soon as the gentleman at the office typed 'Bernhard Pollack' in the system, a microfilm record appeared: *Feld H Abteilung II. Beerdigt am 6.3.1928* ('Field H Row 2. Interred on March 6, 1928').

In the serenity of the *Friedhof*, amidst the musky flora and the avian song, we reached Field H. A partially

Fig. 8. Bernhard Pollack's tombstone at the *Jüdischer Friedhof* in Berlin-Weissensee, documenting the correct dates of his birth and death. Discovered and photographed by the author and his brother on May 3, 2010. Copying, redistribution or retransmission without the author's express written permission is prohibited.

exposed tombstone engraved 'George Lichtheim (1849–1908)' was the only obvious clue to the Pollack family site. To the right, less conspicuous, was 'Clara Lichtheim (1857–1896)' – Pollack's sister. To the left, an inconspicuous black marble, apparently unnoticed for decades, shyly revealing 'EN' through the overgrown vine: the middle characters of *AUGENARZT*. We cleaned the plaque with water from the nearby faucet. A little orange-bellied bird landed on the lower-right corner of the shiny marble and drank a couple of droplets. Memorable. We stayed silent, lost in time, warmed at heart, pondering over the *antiqui huomini*, and a life full of notes and accord (fig. 8).

I made another supposition, that the *Berliner Ärzte-Correspondenz* must have mentioned Pollack's death. I traced the 1928 volume at the Berlin State Library and at the Humboldt University Library. There was a memoir, in the March 17 issue, authored by Dr. Else Wolfsohn-Jaffé [93] – an assistant to Professor Adolf Gutmann. An English translation of that note concludes the present article:

'On March 3, 1928 the Berlin ophthalmologist Professor Dr. Bernhard Pollack, well-known and highly regarded by his colleagues, died. An agonizing malady, which cast its shadow over a long period of time, put an early end to a rich life.

From inner conviction, Pollack chose the medical profession, for which he was exceptionally suited. He began as a devoted student of Weigert in anatomic pathology. He published a groundbreaking comprehensive work on the staining methods applied to ocular microscopy. Moreover, he was outstanding as a practicing ophthalmologist; the circle of his activity expanded soon, and he became increasingly influential after settling in Berlin. He combined great ability with the finest psychology and artistic intuition and was thus able to treat and help anyone, from the common folk to the highly trained artist.

The dual nature of the physician and the artist added a special note to his personality. He was a pianist of the highest rank and mastered virtually the entire piano repertory as a virtuoso performer. Moszkowski called him the greatest memory in existence. He would readily register any request by heart. Once he saw the manuscript of a newly composed piece on a composer's grand piano; he read the score unnoticed and later played it from memory to the astonishment of the composer. The composer immediately remarked, 'You would really impress me, if you could play the compositions I have not composed yet'. Pollack was a close friend of the greatest in the music world. As a young man he journeyed with Kreisler to America. There he enjoyed his first triumph as an accompanist and soloist and became a very welcome guest at the homes of the dollar kings. He was most entertaining and sociable, and with his effusive spirit and wit injected life into any circle.

Those great intellectual qualities were only exceeded by a deep goodness and inner amiability toward others, what one of his friends called a 'charming heart'. Such goodness was his hallmark. Whenever he could, he supported colleagues in need. He would sacrifice himself for his friends anytime they needed it. He lived their destiny as his own, and only those who were close to him can appreciate that his passing leaves a void that can never be filled.'

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