Nearly a century ago, Karl Germain (1878-1956), a magician who had an international reputation for conjuring, became blind from a brain tumor. It ended his career. His physicians in Cleveland, Ohio, advised him to consult the eminent neurosurgeon Harvey Cushing, MD (1869-1939), in Boston, Massachusetts. Cushing successfully removed the tumor and reported the case in his landmark article on meningiomas arising from the tuberculum sellae published in the first issue of the *Archives of Ophthalmology* in 1929. Germain is case number 1 in this publication. Cushing’s description of the tumor earned him the Hermann Knapp Medal of the Section on Ophthalmology from the American Medical Association, named in honor of the founder of the *Archives of Ophthalmology*. Cushing described Germain again in his most important medical book, *Meningiomas*, which was the culmination of decades of work and was not published until 1938, the next to last year of Cushing’s life.

**GERMAIN THE WIZARD**

Germain was the stage name of Charles Mattmueller from Cleveland who was nicknamed the boy wonder of magicians (Figure). He was a friend of the best known magicians of his era, including Houdini and Thurston, but our knowledge of his life is limited because Germain wished to keep his personal history mysterious. He told his eventual biographer, “If you ever write anything about me after I am gone, I will come back and haunt you.”

As a very young man, Germain was skilled at sleight-of-hand tricks and mind reading, which led to several tours. At age 18 years, he undertook a 30-week tour, performing across the country from Boston to Denver, Colorado. During 1905 through 1907, he made 2 tours of England and Ireland and became known as the American Wizard. He had perfected a wide range of magic tricks including mind reading, slate writing, and pushing a wooden block through a solid board. His best known act was the Egyptian water jar illusion, in which 6 jars appeared to be empty, but Germain was able to pour water out of them into an aquarium or a bucket. In 1909, at about age 31 years, he broke a contract to play in London owing to poor health. He gave a farewell performance for his peers, retired from the stage, returned to Cleveland, and studied law at Western Reserve University, graduating in 1914. However, he would occasionally return to the stage. His final performance took place in 1916, shortly before he was diagnosed as having a brain tumor. The neoplasm severely reduced his visual acuity and ended both careers in magic and law.

Following consultations with 3 ophthalmologists, Germain was referred to Cushing at the new Peter Bent Brigham Hospital in Boston. His visual acuity was only 20/200 with the right eye and 20/100 with the left. He suffered from primary optic nerve atrophy and an incomplete bitemporal hemianopsia, but otherwise his general physical and neurologic examinations were normal. Cushing operated, excising a suprasellar me-
ting was a highly visible professor. Then Stecher did his internship at the Peter Bent Brigham Hospital, where Cushing was surgeon in chief. Stecher reported that after surgery, Germain retained his sparkling wit and stayed friendly with theater people of his generation.

HARVEY CUSHING

Arguably, Cushing was the most famous neurosurgeon of the 20th century and the best known medical personality of his era. Both he and Germain were Clevelanders. Cushing was the youngest of 10 children of a Puritan family as well as a fourth-generation physician. His father was a professor of medicine at Western Reserve University Medical School, where one of his brothers was also a physician. As a child, Cushing learned much from his older siblings, and he was boisterous and accomplished. He spent his 4 years of undergraduate education at Yale University (BA, 1891), where he was a good student and a very good athlete. Cushing was outgoing, poised, and even captain of the baseball team. He excelled during medical school at Harvard University (MD, 1895), at his internship at Massachusetts General Hospital (1895-1896), and in his surgical residency at Johns Hopkins Hospital (1896-1900), where the chair was the well known William Halsted, MD (1852-1922).

Cushing continued at Johns Hopkins Hospital after serving as a house staff officer. He performed general surgical procedures, ran the Huerian Laboratory for Surgical Research, and taught students and house staff officers practical aspects of surgery. Halsted had encouraged him to consider orthopedics, but Cushing did not want to go in that direction. His path to specialization in neurosurgery was indirect. Although he was certainly not the first surgeon to operate on the brain, he has been considered the first effective neurosurgeon. Barriers to success in the field were formidable. Few patients underwent brain surgery, and the mortality rate was very high. Referring physicians tended to diagnose brain tumors, his main interest, late in the course of the disease. While some cases of intracranial hemorrhage might be treatable surgically, few neoplasms were treatable by resection. During the first decade of the 20th century, Cushing developed the techniques that allowed him to become known as the leader in successful neurosurgery. Intractable facial pain due to tic doloreux was one of his interests, and he was able to provide relief for many individuals by severing the ganglion of the fifth cranial nerve.

Radiologic studies were often of little help in diagnosing brain lesions. X-ray imaging was introduced by Wilhelm Roentgen in 1895, and Cushing soon purchased an imaging machine. He hauled it with him to Johns Hopkins Hospital, where none had existed previously. Radiologic studies could not identify Germain’s tumor because there were no bony abnormalities and the tumor could not be differentiated from surrounding tissue. No contrast media had ever been used at the time Germain was treated by Cushing. In 1918, air was the first contrast medium used in studying the brain by injection through a trephine entry in the skull into the cerebral ventricles; however, that technique would not have been useful in visualizing a meningioma at the base of the skull.

Cushing relied heavily on the clinical examination to localize brain lesions. Ophthalmologic examination, especially visual field testing, was essential. At Brigham Hospital, field testing was done by residents or ophthalmologist Clifford Walker, MD (1884-1943), a brilliant man who received the first Hermann Knapp Medal ever awarded in 1914. (Cushing was the sixth recipient of the Knapp Medal in 1929.) The field was plotted on an arc perimeter or a tangent screen using white and colored targets of various sizes. Cushing published many articles on the visual fields, some with Walker, including articles in the Archives of Ophthalmology.

Cushing could be charming yet demanding, especially of residents and even of himself. This is important in a specialty in which there is little tolerance for error, but Cushing was often overly harsh with his staff. While operating, Cushing was...
slow and patient and paid great attention to detail. One surgeon asked him jokingly if any tumor had recurred during the procedure. Many people observed him operate, but he concentrated during surgery and did not elaborate on his technique while operating. His primary goal was to serve the patient, and he could be unmerciful to nurses and residents whom he found unprepared or ignorant. He could usually handle the inevitable tragedies, which occurred in difficult cases, but he was sometimes subject to depression.

By 1908, Cushing was able to localize and remove subdural tumors based on clinical evidence. Sometimes he would remove a tumor under local anesthesia and would even talk with the patient during the procedure. Neurosurgery was difficult though. In a letter Cushing wrote to his wife in 1909, he expressed his sadness about his frame of mind, stating “everyone dies that I touch.”

Things soon changed. He became a celebrity in 1910 when he successfully removed a very large meningioma from the brain of General Leonard Wood, who was a physician as well as chief of staff of the US Army. (A decade later, Wood almost became the Republican candidate for the US presidency. Warren Harding was the nominee.)

In 1912, Cushing moved from Baltimore, Maryland, to Boston to become a professor at Harvard University and surgeon in chief of the new Peter Bent Brigham Hospital. His work there was interrupted by military service in France during World War I in 1915 and from 1917 through 1919. Germain became his patient just before Cushing’s second episode of military service.

In 1919, when he returned to Boston to reestablish his practice, Cushing’s friend and mentor, William Osler, MD (1849-1919) died. Osler’s widow prevailed on Cushing to write his biography. The result was a highly celebrated book that earned Cushing a Pulitzer Prize the year it was published (1925).

Cushing’s war memoirs (The Story of US Army Base Hospital #5 and From a Surgeon’s Journal) were also well received. During the 1920s, Cushing operated on several hundred patients a year, mostly for tumors. By the end of the decade, his mortality rate was less than 10%, far better than any of his colleagues. His meticulous technique, which minimized infection, was one factor, but another was the fact that patients were arriving earlier in the course of their disease. Ophthalmologists were more aware of the signs and symptoms of brain tumors and knew that surgical results had improved.

His publications with another neurosurgeon, Percival Bailey, MD, PhD (1892-1973), established a classification system of brain tumors still used today. Cushing also made several technical contributions. One was a silver clip to clamp small blood vessels. Another involved the electric scalpel, which was invented by a professor of physics at Harvard, William Bovie, PhD (1882-1938). In 1932, Cushing published a landmark paper on basophilic adenomas of the pituitary, in which he outlined what soon became known as Cushing syndrome of excess cortisol and Cushing disease of excess adrenocorticotropic hormone production. William Welch, MD (1850-1934), the first dean of the Johns Hopkins Medical School, observed, “Cushing is undoubtedly the outstanding medical figure of the world today.”

After reaching the mandatory retirement age of 63 years in 1932, Cushing returned to his college alma mater, Yale University, as a professor of neurology. Although he did not teach or do surgery there, he stayed productive as a writer. At his death in 1939, Cushing donated his important personal library, which contained many rarities, to Yale, and it is now housed in the Harvey Cushing/John Hay Whitney Medical Library. (Whitney [1904-1982] was married to Cushing’s daughter Betty [1908-1998].) He also bequeathed the Harvey Cushing Brain Tumor Registry, which contains an extensive collection of material from his surgical cases and reopened as a museum within the library in 2010.

CORRESPONDENCE BETWEEN CUSHING AND GERMAIN

The neurosurgeon and his patient never met again after Germain was discharged from Brigham Hospital in 1916, but they did keep in touch by mail until Cushing died in 1939. Even after Cushing died, Germain continued to send information about his health to Louise Eisenhardt, MD (1891-1967), the neuropathologist of the Cushing Tumor Registry who had been Cushing’s secretary before she went to medical school.

At first, their correspondence was formal and dealt purely with Germain’s physical status, particularly his eyesight. Cushing encouraged all patients he had operated on to write him on the anniversary of their surgery to provide health updates. Undoubtedly, Cushing was particularly interested in maintaining a good relationship with Germain because he knew he had injured Germain’s left optic nerve during surgery. Germain was perfectly willing to give Cushing the medical information he desired and made visits to ophthalmologists in Cleveland when Cushing asked him to do so. Cushing found Germain articulate and thoughtful. Their discussions extended beyond Germain’s health into subjects varying from war to philosophy and magic. Cushing’s many interests went far beyond medicine and even included the occult. Their correspondence of about 20 letters from each man is now in the Allen Memorial Medical Library of Case Western Reserve University, Cleveland.

In a letter written about 6 months after his surgery, Germain said that he was feeling better and his vision was slowly but steadily improving. However, he could read only large print when it was printed very clearly. He wished Cushing good luck on his deployment to Europe as a surgeon with the US Army during the war. A week later, Eisenhardt, who was Cushing’s co-author on the meningioma article in the Archives of Ophthalmology and was still Cushing’s secretary at the time (she had not yet gone to medical school), wrote to Germain, informing him that Cushing had left for the front and would be gone from Boston indefinitely and in all likelihood for the duration of the war. During 1921-22, Germain sent Cushing updates about his health, which remained essentially unchanged. Using a magnifying glass, he could read books if the print was good.
In 1927, nearly 11 years after surgery, Cushing wrote to Germain, noting that they had been out of touch for 5 years and that he was very anxious to learn how he was doing. He asked Germain to see his ophthalmologist and forward the results of the examination. Germain complied quickly. His visual acuity was 8/200 with the right eye and only finger counting at 2 feet using the left. Visual field testing still revealed extensive temporal loss in the right eye. The visual field could not be plotted in the left eye owing to the profound loss of vision.

Early in 1928, Cushing sent Germain New Year’s greetings and asked about his vision with the poorer seeing left eye. Germain replied that his left eye was unchanged for the 12 years since his surgery. In good light against a dark background, he could count his fingers when held 1 foot away from the eye. Their correspondence was short until 1932, when, in response to gentle prodding from Cushing, Germain wrote that little had changed with his eyesight. He could read for about 10 minutes before needing to rest and felt he was so poor that he relied on others to read him fragments of the news. Germain wrote that he had “grave suspicions about the generals and ministers who played with human pawns” and that it would be “better to forget the great slaughter, but that is hardly possible while we have daily to deal with its natural and logical consequences, and are constantly apprehensive of an even more terrible aftermath.” Cushing was delighted to learn that Germain was able to read the book he had sent. He modestly told Germain, “How far you will get with my book, I can’t forsee, and I advise you not to waste your time over it.”

In 1937, Germain told Cushing about his career as a stage magician that had ended before his brain surgery. This was a full 20 years after the surgery, but the subject had never come up earlier. Germain sent Cushing a copy of a popular periodical that mentioned him. Writing in his ironic manner that was influenced by his legal education, Germain stated:

Believing that it may interest and edify you for a spell, I am herewith inclosing a copy of The Family Circle. I take the liberty of drawing your attention to the rogues’ gallery of real and stage charlatans. You probably know that I was one of the latter class before you operated on me. If you didn’t, the marked paragraph in the article ‘The Magic Touch’ (though very inexact) may give you some intimation of my chequered past. I was a bosom friend of most of the great and near-great of the world of mystery, and a magician to be able to face your loss of vision with equanimity, and a philosopher as well as a magician – a philosopher to face your remark on performing magic when you operated on me very apt indeed. The pioneer in your gentle art is truly a magician! Three days later, Cushing thanked Germain and wrote that “the most remarkable part of the story” was that he, “a magician, should have had the temerity to put yourself in the hands of another person for so delicate a manipulation.”

Later in 1937, on the 21st anniversary of his operation, Germain unhappily wrote to Cushing that his vision had deteriorated more during the past few months than in any other period following the surgery. Germain adjusted by shifting his interests elsewhere. In his own words, “So my mind still conjures with a wealth of interests, even though it may no longer consort freely with its fellows on the bookshelves.” He hoped that someone would develop a method of splicing nerves and continued, “I presume this notion will bring a smile to your face, just as the proofs of extra sensory perception” brought a smile to him. Cushing’s reply was more serious:

But you are a philosopher as well as a magician, and what passes through your mind in your moments of abstract speculation is of great interest to me. Though neurologists can splice other nerves, they have not yet learned how to splice or restore a damaged optic nerve.

On the 22nd anniversary of his surgery, Germain told Cushing that earlier in that year (1938), he had been run down by an automobile and suffered a concussion. His vision continued to deteriorate and the accident may have been contributory. Cushing’s reply included these remarks: “You are a philosopher as well as a magician – a philosopher to face your loss of vision with equanimity, and a magician to be able to write so that it can be read by your amanuensis.” Cushing noted that he had reached the age “where I am inclined more and more to stick to my home and fireside, my principal solace being the use of my collection of books – a solace which unfortunately is denied to you.”

In 1939, Cushing’s 70th birthday was celebrated elaborately. Eisenhardt, Cushing’s long-time associate, asked Germain to send birth-
day greetings. Germain sent a poem, which was published in the volume that celebrated the event:

To you, I gratefully this toast propose:
To your invincible spirit in research!
To your consummate skill in surgery!
May you discover but not too long search
The scheme of life’s profoundest mystery
And

In blinding men to what is right and wrong
So they may ever sing another song.30

After Cushing died in 1939, Germain continued to keep Eisenhardt informed of his health. The last letter in the correspondence is from 1941 and sadly notes that his vision continued to decline: “While my general health has been fair, my vision has steadily grown less. I now see only shadowy outlines of larger objects and can no longer go about town alone.”31 Roentgenologic study of his skull done in 1940 had shown no sign of recent bony destruction. The floor of the anterior fossa was smooth and regular, with no sign of tumor.

Germain lived on as something of a recluse until he died in 1956. He had outlived his neurosurgeon by nearly 2 decades. Cushing’s memorial in Lake View Cemetery is near the memorial to US President James Garfield, and the smaller ones of J. D. Rockefeller Sr, the oil industrialist, and Eliot Ness of the law enforcement special unit the Untouchables. Germain was laid to rest in Riverside Cemetery. Both Germain and Cushing were born in Cleveland and are reunited in the soil of that city.

Accepted for Publication: May 2, 2012.
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Financial Disclosure: None reported.

Previous Presentation: This article was presented at the 25th Annual Meeting of the Cogan Ophthalmic History Society, National Library of Medicine; March 31, 2012; Bethesda, Maryland.

Additional Contributions: Assistance is gratefully acknowledged from Terry Dagradi, MFA, Yale University School of Medicine; Courtney Pendleton, MD, and Alfredo Quinones-Hinojosa, MD, Department of Neurosurgery, Johns Hopkins University; Gale Oren, MILS, Kellogg Eye Center, University of Michigan; Jennifer Nieves, MA, Ditrick Medical History Center, Case Western Reserve University; Beverly Austin, MILS, Cleveland Public Library; and Jeffrey Taylor, MAC, American Museum of Magic.

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