Gone But Never Forgotten:
Renaissance of the Harvey Cushing Brain Tumor Registry

by
Christopher J. Wahl
Yale School of Medicine
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Dear Colleagues:

The topic of this year's Archives Exhibit is "Transsphenoidal Surgery and the Cushing Tumor Registry," areas of great interest to neurosurgeons.

As in the past, the Archives Exhibit would not be possible if it were not for educational grants provided by the commercial exhibitors in the Archives booth. We are again indebted to Aesculap's Geri Shaffer, Baxter/V Mueller's Kathy Battistella, and Codman/Johnson & Johnson Professional, Inc.'s Roy Black for their continued interest and support. Not only do they provide the necessary financial support needed to execute the Exhibit, they give us an opportunity to identify their company's roles within our theme.

Videos from the Leaders in Neuroscience oral history program that will be shown during the exhibit includes: Francis X. Herr (Codman's Medical Historian), Juan Tavares, Jules Hardy, Frank P. Smith, Paul Bucy, and Eric Oldberg. In addition, the perennially popular "Harvey Cushing's 2000th Verified Brain Tumor Operation" will be shown.

Finally, we would like to thank Yale University Medical Center and Medical Student, Christopher J. Wahl. Please find time to talk to this remarkable young man in the exhibit and share your comments about the restoration of the Cushing Tumor Registry.

The Archives Committee always welcomes feedback. Please address it to me using the address on the back cover of this brochure.

Sincerely,

James T. Goodrich
Chairman
Archives Committee
The Cushing Brain Tumor Registry, in the simplest of terms, is a diary. It is an immense document comprised of over 2,000 case studies: human whole-brain specimens, microscopic slides, about 50,000 pages of hospital records, notes, journal excerpts, and over 15,000 compelling photographic negatives — materials dating from the late 1800s to 1936. It is at once a scientific epic which chronicles the emergence of neurological surgery as a modern medical specialty, an icon for the relentless scientific pursuit of clinical knowledge, and quite literally, a portrait of human misery, bravery, suffering, and triumph.

The Registry actually began as Dr. Harvey Cushing's personal collection which he aspired to become a database of clinical information in the foundling stages of modern surgery on the brain and central nervous system. Its formal organization did not occur until after 1932, when Dr. Cushing retired from his position as Moseley Professor of Surgery at Boston's Peter Bent Brigham Hospital. At that time, he hoped his archive would become a formal repository for brain tumor specimens of all sorts — a dream which would never be realized. When Dr. Cushing accepted a position at the Yale Medical School as Sterling Professor of Neurology, he arranged to have the entire Registry brought with him, complete with microfilmed copies of patient records. This astounding collection has been the property of Yale School of Medicine ever since. The knowledge gleaned from this little-known legacy revolutionized the practice of neurosurgery (and indeed, all of medicine); many of these materials were previously published in scientific journals, monographs, and abstracts. The painstaking methods which created this Registry exemplify an ideal construct for clinical research — a subtle, but equally important contribution to science.

In the past year however, a review of these original materials revealed another rather surprising aspect of Cushing's Brain Tumor Registry. The photographic portion of the archive, aside from its obvious scientific merit, gives the observer a unique glimpse into the world of Dr. Cushing's patients. While nearly a century old, the photographs and records afford one the opportunity to witness a timeless emotional undercurrent, to briefly grasp a sense of what it means to be a person with a serious neurological affliction. The experience becomes more sublime when one stops to consider that the photos were all taken in an era when "brain surgery" was the novel work of only a handful of pioneers.

This exhibit, then, offers excerpts and vignettes from the "complete works" collected by one of modern medicine's most prolific innovators, Dr. Harvey Williams Cushing. The Brain Tumor Registry is not merely an account of his unyielding passion for the acquisition and synthesis of knowledge, but a valuable historical, social, and scientific legacy which documents and vividly portrays the state of American medicine, specifically neurological surgery, in the early twentieth century.
"The Skilled Finger":
Genesis of the Cushing
Brain Tumor Registry

The late Dr. John Fulton, Harvey Williams Cushing’s devoted biographer, faced an inordinate but enjoyable challenge in trying to limit his biography to 754 pages. From his earliest days, a common thread in Harvey Cushing’s life was his obsession with observation, innovation, and relentless documentation — a theme which permeated all of his endeavors.

He was born in Cleveland on April 9, 1869 — the youngest in a family of ten children in which medicine had been a long family tradition. Cushing was a mediocre student in his earliest years at Yale, but had been stimulated by his work with physiological chemist Russel H. Chittenden. H.C. earned his B.A. in 1891, and immediately matriculated at the Harvard Medical School. His experience at Harvard was wholly different from Yale, and he proved to be an exemplary student there.

At Harvard, Cushing first evidenced his unusual capacity of clinical observation and innovation. Numerous drawings and notes (many of which were kept) display an extraordinary sense of detail and clarity. It was during his time as a medical student that Cushing and one of his close friends and classmates, Amory Codman, made their first major contribution to medicine — the observation of pulse and respiration during anesthesia. While the idea seems sophomoric to the modern scholar, Cushing and Codman’s “ether charts” revolutionized early surgery.

After medical school, Harvey Cushing stayed on at Massachusetts General Hospital for one more year as an intern. During this year, Cushing and Codman recognized the utility of Roentgen’s discovery of the X-rays. He and his friend purchased a hand-held device for the use of the hospital.

By 1896, a young Dr. Cushing accepted an appointment as resident in surgery at the Johns Hopkins Hospital in Baltimore at a compensation of $100 per annum. J.H.H. afforded Cushing the opportunity to observe William Stewart Halsted’s slow, meticulous surgical technique — a technique which he undoubtedly emulated throughout the rest of his career. Upon the urging of William Halsted, William Osler, and William Welch (directors of the J.H.H.) Cushing spent the year from 1900 to 1901 abroad. His first stop was England, to work with Victor Horsley, the founder of modern neurosurgery. Indeed, the rest of his year traveling throughout Europe brought Harvey Cushing into contact with many of the most influential scientists in history, including the prolific Swiss surgeon Theodor Kocher, and physiologists Hugo Kronecker and Charles Sherrington. Perhaps it was serendipity, but Cushing seemed to be working with problems related to the central nervous system, its circulation, and the physiology of the motor cortex. Cushing returned to the U.S. after a visit to Pavia, where he had seen Riva-Rocci’s primitive blood pressure apparatus. He managed to secure a duplicate for his trip home. Much to his surprise, when the young Dr. Cushing presented a paper on the utility of the device in Boston, the work was initially dismissed as insignificant.
The turn of the century found Cushing back with William Halsted at Johns Hopkins in a general surgery practice. He had met and married Katherine Stone Crowell, with whom he would eventually have five children.

Cushing’s practice slowly evolved to include mainly operations on the pituitary gland, then other branches of neurological pathology. His early operations on brain tumors had been very disappointing; he initially reported mortality rates of up to ninety per cent. However by 1910, the outlook was not so bleak. Cushing managed to successfully remove a tumor from General Leonard Wood, one of the most influential figures of his time — the operation did much for Cushing’s reputation. Certainly, in the years between 1905 and 1911, much of Harvey Cushing’s innovation in surgery revolved around hemostasis. He pioneered work with tourniquets to stop bleeding from the scalp, developed and fabricated his own arterial “silver clips”, and defined his technique of using pledgets of muscle and clotted blood to slow venous oozing (the fibrin within those tissues served as primitive “gelfoam”).

By 1912, Harvard petitioned Harvey Cushing for a return to Boston to take part in the design and planning of a brand new hospital, the Peter Bent Brigham. Cushing could not refuse an offer to be surgeon-in-chief in a hospital of his own design, and by the early part of 1913 his neurosurgical clinic at the Brigham was in full swing. Indeed, Dr. Cushing piloted an impressive program: deftly marrying the surgical clinic, the laboratory, and resident training. During World War I, Cushing helped to organize Harvard’s Base Hospital No. 5 in France. In 1917, he suffered a severe attack of polyneuritis there, the effects of which would plague him for the rest of his life.

Unfortunately, 1919 brought the death of Cushing’s long-time mentor, Sir William Osler. At the request of Lady Osler, Cushing wrote the prolific physician’s biography. The Life of Sir William Osler was published in 1925, and would eventually win the Pulitzer Prize.

Between the years 1922 and 1932, Harvey Cushing did an astounding amount of work. He operated almost incessantly and published (with the help of his assistants, Dr. Louise Eisenhardt and Dr. Percival Bailey) over 14 books and monographs, and over 300 journal articles related to neurological surgery. By any measure, it was a period of intense productivity. Again, advances in hemostasis — notably the “bovie” or electrosurgical techniques — made for startling advances in Cushing’s surgical technique. On several occasions the neurosurgeon brought patients which he previously deemed “inoperable” back to his revolutionary operating room.

After retiring from the Brigham in 1932, Harvey Cushing was lured back to his alma mater and given Yale’s prestigious Sterling Professorship in Neurology. He was appointed Director of Studies in the History of Medicine, and later promised that a special library would be built to house his immensely valuable and treasured collection of historic books and incunabula. (Since his time in Europe, H.C. had been a famous historic bibliophile). Dr. Cushing persuaded his two close friends and fellow bibliophiles, John Fulton and Arnold Klebs, to donate their collections as well. The result is the Harvey Cushing/John Hay Whitney Library, with one of the largest medical historical collections in the world.

Cushing died at the New Haven Hospital on October 7, 1939. He was 70 years old.

The Cushing Tumor Registry would never have become so comprehensive an archive had it not been for the participation of Louise Eisenhardt, Dr. Cushing’s long time friend and collaborator. She began her relationship with him in 1915, serving his office as an editorial assistant. Ms. Eisenhardt worked with such diligence that Cushing entrusted her with the responsibility to complete one of his earliest monographs — *Tumors of the Nervus Acousticus* — while he served in the war overseas. Ms. Eisenhardt became enrobed in the monographs, and by 1921 she had matriculated at the Tufts University School of Medicine. She never left Cushing’s employment while attending school, and graduated with the highest marks ever awarded at the institution. In 1922, she began a log which documented the diagnoses (both provisional and final), operative outcomes, and classifications of Dr. Cushing’s entire surgical series. Ms. Eisenhardt graduated in 1925 — the first female neuropathologist — and had already amassed an extraordinary amount of data involving the classification, behavior, and prognosis of intracranial tumors. Indeed, her complicity with Drs. Cushing and Bailey paved the way for a number of neurosurgical monographs. Dr. Eisenhardt kept the records and outcomes of Cushing’s surgical procedures in a register which came to be known as the “Little Black Book”. She alone had access to the document, and refused Dr. Cushing the luxury of viewing it (lest he attempt to influence her or make more favorable his operative statistics). It was not until the event of Harvey Cushing’s seventieth birthday party, during a celebration before The Harvey Cushing Society, that the neurosurgeon saw the book. He burst into Dr. Eisenhardt’s office and demanded the book from her overwhelmed secretary, Betty McCarthy. Reluctantly, she surrendered the book, which Cushing proudly passed around at the party for everyone to see. He playfully remarked:

“Had it not been for this confounded little book which [Dr. Eisenhardt] was prone to consult at awkward moments, the operative and case mortality percentages for the meningiomas would have been found much lower and the end results much better. For had I been left to myself, the temptation to exclude a case here and there to improve the figures would have been irresistible...” Davey, *J Neurosurg* 80: p343.

Dr. Eisenhardt served as the first editor of the *Journal of Neurosurgery* from 1944 until 1965. Her studies not only placed her among the scientific elite of her day, but set the foundation for the formal histological and pathological classifications of many neurological tumors: her records form the very soul of the Registry.

A complete misunderstanding provided the impetus for the formal organization of Harvey Cushing's personal collection of human tumor and brain specimens, microscopic slides, patient records, and photographs. In a letter from S. Burt Wolbach, pathologist at the Peter Bent Brigham Hospital (dated April 8, 1932 — H.C.’s 63rd birthday), he exclaims, “A chance remark dropped by Dr. Elliot Cutler yesterday to the effect that you contemplated destroying your collection of brains quite horrified me.” He suggested alternative fates for the collection.

Cushing replied the following day, “Nothing under the sun would induce me to destroy the brain collection. After all, they don’t belong to me, but to you...The whole series is so carefully recorded that they ought to be of permanent value as a sort of library...to which obscure specimens might be sent and added as time goes on...”

So began the rather convoluted history of Dr. Cushing’s brain collection. There was an immediate movement to establish the collection in the Warren Museum at Harvard Medical School. There were some financial difficulties from the outset, and structural changes would be required in the museum. As difficulties arose, Wolbach and Cutler seemed to lose interest in the project — and the organization, minimally funded, was left to Drs. Cushing, Eisenhardt, and Dr. Percival Bailey, who ran Dr. Cushing’s neuropathological laboratory and cooperated with him on the publication of his monographs.

In all, Dr. Cushing had saved approximately 2000 specimens: tumors resected in the operating room, and when possible, whole brain specimens from patients who had previously been to see him. (The hospital autopsy rate in the 1930s approached 90%, and there is evidence in the hospital charts that some autopsies were even conducted at the patient's homes!) Additionally, Cushing, Eisenhardt, and Bailey had amassed a photographic archive of nearly 15,000 negatives, all printed on glass plates. Often these images appeared in monographs and journal reports. Photographic material included photomicrographs of microscopic specimens from tumors, operative drawings, and even obscure journal articles relating to specific cases. The keys to the entire archive were Louise Eisenhardt's log (her “little black book”) and the Brigham Hospital records. In these records, one can easily elucidate the clear reasoning and precise courses of action employed by the neurosurgeon, and his didactic, educational progress notes are exquisite in their clarity and detail.
September of 1934 finds Dr. Cushing en route home to New Haven from a trip to Montreal to see Osler’s books and celebrated the opening of Wilder Penfield’s Neurological Institute. He anxiously awaited the arrival of Dr. Eisenhardt, who would be bringing his entire Brain Tumor Registry from Boston. On the occasion of his trip, Cushing made the decision to leave his own Historic Library to Yale. He discussed the matter with Mrs. Cushing and sent a handwritten proposal to his colleague and fellow collector, Arnold Klebs: “I wake up in the middle of the night with the thought — why not a Klebs-Fulton-Cushing Collection so that the three could go down to bibliographic posterity hand in hand? Just imagine some young fellow long hence stumbling on our diaries and papers and correspondence about books. I envy him to think what fun he would have for I think in a certain way our three collections share a more personal and intimate provenance than has W.O.’s Library...” Thus, the inertia had been overcome — Yale would be bequeathed three of the finest personal collections of medical historical texts, manuscripts, and *incunabulae*. Drs. Cushing, Fulton, and Klebs corresponded frequently on the matter after Cushing’s initial suggestion.

The bibliophilia shared by the three men was impressive. Dr. Cushing’s personal interest awakened back in 1900 — while he was abroad studying with the great surgeons and physiologists of his day. The trip transformed into a “medical pilgrimage” of sorts, and he collected materials from that time on. Over the next 40 years, the doctors stole time from their work, studies, and families to collect and browse these manuscripts. They often sent one another texts to review and peruse, and much of their original correspondence still remains within the leaflets and between the pages of the materials. To Cushing, the collections provided some respite from his incessant operations and rounds, and his centered on the incunabula and medical historical texts. Klebs found texts documenting the history of science more to his liking, and Fulton — his was a somewhat eclectic mix of the two. Indeed, one letter written from Klebs to Fulton’s wife, Lucia, suggests that she use whatever influence she may have to keep her husband interested in his experimental work “...before he plunges finally into his most beloved task of book lore.” At any rate, the collections complimented one another quite well, and perhaps because of the rarity of the materials and sharing between the bibliophiles; redundancy was kept to a minimum.

In addition to his Pulitzer Prize winning biography of Sir William Osler, published in 1925, Cushing spent the latter years of his life writing and collecting essays on his experiences as a surgeon, and his opinions on medicine and medical education. Books like *From a Surgeon’s Journal, The Medical Career*, and *Consecratio Mediici* provide clues to H.C.’s passion for his work.

The Yale Medical School was extremely fortunate to acquire this magnificent collection. Cushing himself hoped that young scholars would have access to these documents to enjoy as he did, and thanks to a handsome grant from Betsy Cushing-Whitney, H.C.’s daughter, these phenomenal materials have been preserved in the Harvey Cushing/John Hay Whitney Historical Library. They are available for the enjoyment of students, faculty, and friends of the medical school.
Finding
“Archemides’ Lever”: Cushings Lesser-known Legacy to Yale

By June of 1934, the financial and technical problems facing the newly-organized Tumor Registry at Harvard became too much a burden for a retired Cushing to withstand. J.B. Conant, then president of the school, had been excited to have the Registry at Harvard, but could not secure the financial backing H.C. required.

Dr. Cushing had already left Boston for New Haven in 1933 after his retirement from the Brigham. He assumed a position as Sterling Professor of Medicine in Neurology, and routinely lectured to students and staff of the New Haven Hospital. However, Dr. Cushing longed to continue his work with the monographs — having yet to complete his catamount work on his meningioma series. He wrote to Dr. Eisenhardt (still at Harvard) and suggested that she “...take a yardstick and give me an idea of the floor space that the collection of tumors covers...so that we can get some idea of the cubic space the collection occupies...” Dr. Milton Winternitz, head of the pathology department at Yale, had designs on the collection, and assured Cushing he would allocate a suitable space for the entire Registry.

H.C. then urged Louise Eisenhardt to accompany the collection to New Haven, that they may continue their collaboration on the monographs. In a letter of June 27, 1934, Conant reluctantly admitted to Cushing that “his dreams could not be brought to fruition...at Harvard” and should have the collection moved to Yale. Dr. Eisenhardt arrived in New Haven with the specimens in September of the same year. The next problem to face involved making the Brigham records available for use. Owing to an endowment by the Bolton Fund and with grants by the Childs Fund, H.C. was able to have the entire set of records from his surgical series, in addition to several hundred others required for “special purposes”, photographed onto microfilm and brought to New Haven.

The Registry was comfortably arranged in the Brady Museum, and Dr. Eisenhardt, appointed director of the collection, given her own laboratory in Lauder Hall. Cushing and Eisenhardt completed Meningiomas by 1938, and notice had been made in neurosurgical journals that the Registry was available for study or deposit of obscure specimens.

Dr. Cushing’s spent much of 1938 in poor health. He concentrated much of his efforts writing on the text for his Bio-bibliography of Andreas Vesalius (for which he had been gathering material over 40 years), and no longer had the desire to pursue another monograph. Percival Bailey, H.C.’s past resident, co-author, and laboratory director found himself at the University of Chicago, working with Eric Oldberg. It is a little known fact that Bailey, Cushing, and Oldberg were in accord on the theory that the entire Registry should be moved again, this time to Chicago, where Bailey could continue the research on H.C.’s series and publish monographs on other tumor types not yet addressed.
However, these plans were interrupted in 1939 by the death of Harvey Williams Cushing. Ironically, at that time, Howard M. Hannah of Cleveland (whose only son had succumbed to a neurological tumor), richly endowed the Cushing Brain Tumor Registry at Yale (an event which finally lifted Cushing's collection to the status he felt it deserved). Louise Eisenhardt and the collection would stay in New Haven, where she served as the editor of the *Journal of Neurosurgery* and hosted scholars from all over the world.

Dr. Eisenhardt passed away in 1967, leaving curator-ship of Harvey Cushing's aging collection with Dr. Elias Manuelidis. By the early 1970s, few scholars came to study the archive. The over 40-year-old specimens were in a void — too old to be of scientific value, and ironically, too young to be of historical interest. Neuropathology seceded from pathology, and Manuelidis received pressure to find a new space for the archive. Realizing the future historical potential of the collection, he was faced with a genuine quagmire — what to do with an enormous collection of photographs, laboratory materials, and aging gross specimens which reeked of formaldehyde? The answer was clear — the sub-basement of the Edward S. Harkness Medical Student Dormitory.

Perhaps Dr. Manuelidis counted on the fact that an enormous historical collection of brain specimens and photographs, dating to the turn of the century, would be too great a temptation for medical students to avoid. Rumors of the Registry's existence became part of the lore of Yale Medical School, and trickled through members of each class, year after year. The collection has received many visitors over the past two decades and no doubt been witness to many a bizarre ritual — however, it has remained surprisingly intact. Nearly a century after the first specimens were collected and archived, history has leant the collection the patina it requires to be re-evaluated for its scientific, ideological, and artistic historic value. Plans are currently underway by the Sections of Neurosurgery and Neuropathology at Yale to refurbish and reexamine the remaining materials from the Harvey Cushing Brain Tumor Registry, with the hope that this historic archive may once again be made available for study by neurosurgeons and historians worldwide.
While the immense practical scientific contribution that Harvey Williams Cushing made to the practice of medicine (particularly to neurological surgery) is clear, perhaps his even more profound ideological contributions are more subtle. One must stop to consider that Cushing began his career when the automobile was a mere novelty, and within thirty years had taken surgery on the brain from a nearly unanimously-fatal act of desperation to a legitimate practice in American medicine. He had been glamorized by the media as the “brain surgeon”; his remarkable charisma, demeanor, and megalomaniacal resolve became associated with the iconography that lay persons still associate with physicians in general, and neurosurgeons in particular. Harvey Cushing left an indelible impression on what it means to be a doctor: that of the scholar, teacher, scientist, and humanitarian.

Aside from Harvey Cushing’s obvious innovations in neurological surgery, the Brain Tumor Registry testifies to an equally important ideological development in medicine: the continued tradition of careful, honest observation, clinical correlation, and the development of elegant, simple solutions to clinical problems. H.C. virtually abandoned the scientific laboratory for his clinical studies, and excerpts from his Registry take on the character of lucid correlations — records chronicling his attempts to alter the course of nature through a better understanding of it. Clearly these lessons have permanently impacted the practices of medicine and science.

Specifically, one will recognize similarities between the images correlated for you here from the Brain Tumor Registry, and our modern dependence on Magnetic Resonance Imaging, Functional MRI, Electroencephalograms, Computed Tomographic Scans, ultrasound, and every other sort of modern diagnostic technique not to mention the more common technologies that have been around since before H.C.’s days, like the microscope.

The Harvey Cushing Brain Tumor Registry affords the opportunity to understand the evolution of the empiric method in modern medicine. Owing to its antiquity, the collection of photographs, specimens, slides, and hospital records also give a first-hand glimpse into the world of American medicine in the beginning of the twentieth century. The archive has been buried for many years, but the lessons were never forgotten.
We are looking forward to a complete restoration of the Cushing Brain Tumor Registry. In order to accomplish this task, we have established the Cushing Historical Renovation Fund. This fund will provide for restoring certain of the whole brain specimens, cataloguing the 15,000 photographic negatives and providing space to display as many of the materials as possible. The space to be restored is in John and Lucia Fulton’s home which is owned by the Axion Foundation. The Fulton House Board of Directors want to eventually provide guest accommodations for neuroscience scholars visiting the Cushing/Whitney Historical Library and the Brain Tumor Registry.

Individuals donating at least $200 to the fund will be sent one print of any of the photographs displayed in this exhibit, and an additional print is available for every $100 donated thereafter. Please indicate the print(s) of your choice and make check payable to the Cushing Tumor Registry Restoration Project. The check can be mailed to: Yale University Medical Center, Section of Neurological Surgery, P.O. Box 208039, New Haven, CT 06520-8039.

Christopher J. Wahl (YMS IV)
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