The life and legacy of William Beecher Scoville

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Dr. William Beecher Scoville (1906–1984) is a giant figure in the history of neurosurgery, well known by the public for his operation on Patient H.M. He developed dozens of neurosurgical instruments and techniques, with many tools named after him that are still widely used today. He founded numerous neurosurgical societies around the world. He led the movement in psychosurgery, developing the technique of selective orbital undercutting and performing hundreds of lobotomies throughout his career. However, his many contributions to the advancement of neurosurgery have not been well described in the medical literature. To bridge the knowledge gap, this article seeks to detail the life and career of William Beecher Scoville and bring to attention the enduring impact of his work.

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Perhaps best known for his operation on Patient H.M., Dr. William Beecher Scoville is a giant figure in the history of neurosurgery. He was an inexhaustible inventor of surgical instruments, a pioneer of novel techniques, an avid teacher and mentor, a founder of neurosurgical associations, and an outspoken proponent of psychosurgery. Outside of the operating room, he was also a car enthusiast, a daring adventurer, and a free thinker who spoke his mind. A newspaper described Scoville as “a sort of James Bond in scrubs who loved fast, expensive cars and motorcycles, a demanding dynamo in the operating room, brilliant at his craft.” Nevertheless, surprisingly few biographical articles about Scoville have been written in the medical literature. The waning focus on medical history in medical education may lead to a loss of knowledge about important figures such as Scoville and the legacy they leave to neurosurgery today. This article seeks to detail the life and career of Dr. William Beecher Scoville and bring to attention the enduring impact of his work.

Early Life and Career

Born in Philadelphia in 1906, William Beecher Scoville was one of five children of Katharine Trumbull and Samuel Scoville Jr. (Fig. 1). William’s father took his family out on camping trips in the Connecticut woods and on vacations to their summer home on the coast of Maine. Although William loved cars and seriously considered pursuing a career as an auto mechanic, his father forbade him from doing so, ultimately pushing him toward medicine. His education boasted an elite path from the Loomis Chaffee high school to his father’s alma mater at Yale for his undergraduate degree, and subsequently to the University of Pennsylvania School of Medicine for his medical degree in 1932.

After a rotating internship in Hartford, Connecticut, Scoville initially started training in psychiatry at New York Hospital but “couldn’t stand the meditation; and no cures; and no action.” He then went on to study neurology at Bellevue Hospital under Foster Kennedy, followed by a yearlong fellowship performing neuroendocrinology research at Massachusetts General Hospital under Stanley Cobb and Fuller Albright. His fellowship was not particularly successful, and Scoville wrote to Albright that his work was a “hodge-podge of information of no great value.” Yet the year proved invaluable in another way. During his free time, he found himself in the operating rooms of neurosurgeons at the hospital and found his calling in neurosurgery. The following year, he began his neurosurgical training at Massachusetts General Hospital, where he received the tutelage of William Mixter, James White, and Reginald Smithwick. He then went on to vari-
ous rotations such as at Lahey clinic, where he trained with Gilbert Horrax and James Poppen, and at hospitals in Baltimore, under Charles Bagley Jr. and Walter Dandy. Scoville remarked that of these experiences, “the most exciting training was watching the technical perfection of Poppen and a summer with Dandy.” He enjoyed training with many different neurosurgeons, remarking later in his career that the new requirements that residents stay at one center for the entirety of their training was undesirable, and that historically “students visited great men, not great institutions.” Scoville described his love for neurosurgery as offering “infinite variety dealing with the mind, with feelings, with locomotion, with the endocrine system, with drama—always with exquisite instrumentation. How could anyone go into cardiac surgery—only a pump; thoracic surgery—only a ventilator; orthopedic surgery—such crude instruments!—or urology—a sewage system which should appeal only to the more morbid followers of Freud.” He believed neurosurgery to be a profession “for men of prowess, courage, ability and inspiration.”

In 1939, Dr. Scoville returned to Hartford Hospital and established its first department of neurosurgery. He also started the first neurosurgical residency training program in Connecticut in 1941. When World War II erupted shortly after he started as a practicing neurosurgeon, he enlisted in 1942 and rose to the rank of major, stationed initially at Walter Reed General Hospital, then at McCaw General Hospital in Walla Walla, Washington, and last at Cushing General Hospital in Framingham, Massachusetts. Due to his nonconformist personality, Scoville was at times a headache to his superiors and was forced to handle the paraplegic service by his superior, Dr. William Perrine Van Wagenen. Unfazed, Dr. Scoville used his energies to develop new therapies for this patient population. Following his discharge from the armed forces, Scoville spearheaded efforts within his local Hartford community to organize rehabilitation workshops and programs for paraplegic patients, earning him a national award for distinguished service from the National Society for Crippled Children and Adults.

Dr. Scoville inspired awe and ire from his colleagues and residents, who told colorful stories about him that earned him the nickname “Wild Bill.” These included feats such as fleeing Connecticut state troopers while speeding on his drive to work, rupturing his spleen while attempting a wheelie on his new motorcycle, and super-

FIG. 1. Photos of William Beecher Scoville. A: Dr. Scoville. B: Dr. Scoville’s first wife, Emily Barrett Learned. C: Dr. Scoville’s first family. D: Dr. Scoville (right) performing an operation. E: Dr. Scoville holding a capote in a bullfighting ring, trying his hand at bullfighting while in Spain for a conference. F: Dr. Scoville at his daughter’s wedding, preparing to escort her down the aisle. Used with permission from Luke Dittrich. Figure is available in color online only.
vising his own surgery for a herniated disc by setting up a network of mirrors. During his second year of medical school, he was said to have summited the George Washington Bridge in New York City. In 1958, while at a medical conference in Europe, Scoville was said to have test-driven a Ferrari with Enzo Ferrari, who refused to sell him the car because he would be “dead within the year.” At his work environment, Scoville did not get along with William Collins, the chief of neurosurgery at Yale Hospital, who thought that Scoville was a negative influence on the Yale residents. Meanwhile, Scoville thought that Collins was too careful and “that nobody made progress by doing the same thing over and over.” Also, Scoville waged a turf war with James Foster, Hartford Hospital’s chief of general surgery. When Scoville ruptured his spleen and Dr. Foster was about to operate on him, Scoville refused until his best friend Benjamin Whitcomb pleaded with him. Yet, Scoville was undoubtedly a brilliant neurosurgeon who was beloved and respected by his friends and colleagues, who affectionately referred to him as “Billy.”

In 1974 Scoville was invited to give the Charles Elsberg Memorial Lecture of the New York Society for Neurosurgery, where he described his surgical technique as the “three S’s—simplification, speed and sterility.” Scoville then continued on to outline his philosophy: a refusal to practice defensive medicine, a tendency to “listen to everyone but not pay too much attention to anyone,” and the ideal of being an honest surgeon. Summarizing his thoughts on neurosurgery, Scoville said: “What does neurosurgery mean to me? I prefer action to thought which is why I am a surgeon. I like to see results. I am an auto mechanic at heart and love perfection in machinery and so I chose neurosurgery.” Dr. Scoville found great success in his career, as the chief of neurosurgery at Hartford Hospital for 29 years, as a clinical professor of neurosurgery at the University of Connecticut Health Center, and as a professor at Yale for 13 years.

**Surgical and Technological Innovations**

Coinciding with his love of cars and original ambition of becoming a mechanic, Scoville was an avid inventor and developer of new technologies and surgical techniques. Many surgical instruments that are now widely used are named after him. One includes the Scoville retractor, a self-retaining laminectomy retractor (Fig. 2 left). Another is the Scoville-Lewis aneurysm clip, a torsion bar clip designed to enhance the visualization and decrease the likelihood of injury to adjacent structures (Fig. 2 right). At the time, it was the only self-closing clip that did not require a special applicator, and it was highly demanded in many countries due to its low cost. Other instruments include the Scoville trephine, Scoville curette, Scoville malleable brain spoon, and Scoville-Greenwood bipolar. His other contributions include developing various novel neurosurgical techniques, such as refining the posterior approach for cervical disc herniation, the keyhole foraminotomy technique, and his innovative use of the power drill for cervical laminectomies. In the journal articles in which he introduced these instruments and techniques, he would sketch many detailed drawings (Fig. 2). Under his leadership and with his surgical innovations, Hartford Hospital became a world-renowned neurosurgical center for intervertebral disc surgery. To share his passion for invention with like-minded neurosurgeons, Scoville founded the Committee on Devices in the American Association of Neurological Surgeons and the Committee on Materials and Devices in the World Federation of Neurosurgical Societies (WFNS). Additionally, Scoville sought to disseminate his new techniques to rising neurosurgeons. Together with Bruce Trembly, he cotaught an annual course in neurosurgical techniques at Colby College, which at the time was one of the longest-running courses in neurosurgical education. Furthermore, he taught various apprentices from other countries who came to visit him: Dalle Ore from Italy, Guy Corkill from Australia, Fernando Cabieses from Peru, and Chikao Nagashima from Japan, all of whom learned from his innovative techniques and became distinguished professors in their respective countries.

**Leadership in Organized Neurosurgery**

Scoville was a true internationalist and loved to travel for pleasure and work. His childhood idol was Richard Haliburton, a famous American travel author and adventurer, and as a student he would often vacation abroad, sometimes riding his bike and sometimes working for his passage on ships. Throughout his career Scoville made it a point to go to various neurosurgical centers around the world, such as the Moscow Institute of Neurosurgery in the 1950s and India in 1966. He visited great neurosurgeons throughout the world such as Gösta Norlén and Herbert Olivcrona in Sweden, Hugo Krayenbühl and Gazi Yaşargil in Switzerland, Thierry de Martel and Clovis Vincent in France, and Norman Dott in Great Britain. At international medical conferences, he would take the time to explore local activities, such as trying his hand at bullfighting while in Spain (Fig. 1E).

He envisioned the need for a global neurosurgical association and for collaboration among neurosurgeons. Neurosurgeons in the early 20th century were a small group and had previously shared ideas internationally as an offshoot of the International Congress of Neurology. However, their rapid growth in numbers and increasing focus on neurosurgery-specific issues warranted the creation of...
In 1955, Scoville wrote a letter to 17 neurosurgical societies in Europe and America, urging for the formation of an “International Congress of Neurosurgery” to gather “all qualified neurosurgeons throughout the world and to assure representation by each and every country.” This helped to spark the First International Congress of Neurosurgery in Brussels in 1955, and later the creation of the WFNS, where he eventually served as an honorary president (Fig. 3).

Within the WFNS, Scoville became the first editor of the Bulletin of the World Federation of Neurosurgical Societies, with the aim of keeping in touch between meetings. The first issue was published in May 1963, and was sent to all members of member societies across the world. Through the WFNS, Scoville also interacted with luminaries such as Paul C. Bucy, working together to host the first International Congress by North Americans in Washington, DC, in 1961. Bucy includes Scoville as one of the most distinguished neurosurgeons in his book Modern Neurosurgical Giants, and quips that “Billy” Scoville was one of the “wild men of neurological surgery” with regard not to his surgery but to his personality. As editor of Surgical Neurology, Bucy had to repeatedly correct the spelling, grammar, and organization of Scoville’s manuscripts, although “Billy never took offense.” Although Scoville had accomplished many things, Paul Bucy thought that Scoville’s greatest accomplishment was his almost single-handed creation of the WFNS.

As he lived in the New England area, Scoville also recognized the need for a regional society of neurosurgeons to share knowledge. He wrote to every neurosurgeon in New England, and in 1951 helped to establish the New England Neurosurgical Society, of which he was elected to be its first president. Scoville continued on to hold myriad leadership positions in other neurosurgical societies, such as becoming a founding member and first presi-
an ardent proponent of psychosurgery and one of the most prolific lobotomists of his time, Dr. Scoville shaped the field in the mid-20th century. A large driver of his motivation was likely to have been personal. William Scoville married Emily Barrett Learned, a pianist and college graduate from a wealthy family, in 1934 during his final internship year at Hartford Hospital (Fig. 1B). Nine years later Emily started having hallucinations and delusions, attempted suicide by hanging, and was discovered just in time by a neighbor. She was diagnosed with schizophrenia and subsequently admitted to the Institute of Living, a private mental health center in Connecticut. At this time, patients were subjected to unproven and potentially harmful treatments. At the Institute of Living, Emily endured rounds of continuous hydrotherapy where she was kept in a tub of cold water, fever therapy where infrared lamps would induce oppressive temperature spikes, and electric shock therapy where she would be forced to convulse in violent muscular contractions. It is likely to have been because of her suffering and lack of improvement that Scoville took the reins of psychosurgery with such vigor and performed more than 600 lobotomies. He once wrote a note to his son Peter saying, “I have spent 20 years in studying and operating on mental illness in the hope of contributing to a cure of it—for [Emily’s] sake.”

In America, Walter Freeman and James Watts developed the first prefrontal lobotomy in 1936. Freeman later developed the transorbital “ice pick” lobotomy that he could perform without his neurosurgeon counterpart, and completed thousands of procedures. Scoville had called Freeman’s technique “undesirable” with a “complete lack of precision,” going so far as to have a showdown in front of a live audience comparing their surgical techniques. The rise of psychosurgery at this time coincided with the economic crisis mental institutions were facing. Across America, asylums were struggling from overcrowding and worsening living conditions. The Connecticut Cooperative Lobotomy Study was born out of a need to “ease the load on mental hospitals,” allowing neurosurgeons such as Dr. Scoville, who had been a member of the consulting staff at the Institute of Living since 1941, to perform prefrontal lobotomies at Connecticut mental hospitals.

Dr. Scoville refined the prefrontal lobotomy by introducing a new technique called selective orbital undercutting, which he insisted was more precise and less harmful than prior methods (Fig. 4). He targeted Brodmann areas 9 and 10 as well as the orbital and cingulate gyrus, which produced results “largely of a negative nature,” and yet he claimed that “the therapeutic results justify further investigation.” At the time, the function of the medial temporal lobe structures was largely a mystery, and Dr. Scoville started experimenting with electrical stimulation and resection of the uncus in asylum patients, which did not seem to have much of an effect. He expanded this research to perform complete medial temporal lobotomies, which were also inconclusive. After 4 years, he had performed these surgeries on 230 patients with the thought that “continuing limbic lobe studies may bring us one blind step nearer to the location of these deeper mechanisms.” It was a turbulent time for psychiatric surgery in the 1970s with Dr. Scoville at the helm, described as the “sole survivor in Connecticut” to continue performing psychiatric surgery despite its tarnished reputation. Scoville’s efforts to revitalize the field included founding the International Society for Psychiatric Surgery, which ultimately disbanded in 1983. Scoville recognized that psychosurgery had fallen out of favor due to the improvements in other treatments, but defended its utility as a last resort in select patients where psychosurgery would still be “ethically proper.” It was rumored that Scoville had performed orbital undercutting on his first wife, which was supported by Karl Pribram and thought to be unsurprising to his previous residents. Whatever legacy Scoville leaves behind from his advocacy of psychosurgery, it was his experience with these surgeries that led to his eventual operation on Patient H.M., which would transform our understanding of human memory.

**Patient H.M.**

To the public, Dr. Scoville is best known for his operation on Patient H.M., perhaps one of the most famous patients in the history of neuroscience. Henry Molaison was 8 years old when he was struck by an inattentive bicyclist, falling unconscious briefly before recovering. This seemingly benign accident would lead to the onset of increasingly worsening seizures that eventually incapacitated him despite aggressive treatment with multiple antiepileptic medications. His primary care physician, Dr. Harvey Goddard, consulted Dr. Scoville for possible surgical intervention. Interestingly, Scoville had lost his younger brother—also named Henry—to a bicycle accident while he was away at college, potentially drawing parallels to this Henry. Dr. Scoville offered Henry an ambitious and experimental procedure, which was to remove Henry’s bilateral medial temporal lobes, whose functions were largely unknown at the time but were thought to be the epileptogenic foci of his seizures. Dr. Scoville later described this decision as a “tragic mistake” that led to his “lifelong interest in memory and the temporal lobe.”

The operation, which had only a limited impact on Henry’s epilepsy, caused severe anterograde amnesia and turned Henry into one of the most studied patients in history as “Patient H.M.” Scoville had met Wilder Penfield in a neurosurgical conference in New Mexico in May 1954, where they discussed their experiences operating on the medial temporal lobes. Afterward, in March 1955, Penfield wrote to Scoville saying that he had “thought many times” of their conversation and that he wished for Brenda Milner to go visit Scoville to study his cases. Milner discovered that H.M. had lost the ability to form new episodic, autobiographical memories, but that his cognitive ability, short-term memory, and motor skills appeared to remain mostly intact. Molaison’s operation paved the way toward...
uncovering immensely consequential knowledge about human memory, largely credited to the work of Brenda Milner and Suzanne Corkin. The hippocampus became known to be crucial in the formation of memories, whose faculties Henry had lost. Although Henry was not able to acquire new memories, he did retain his previous memories prior to the surgery, leading to the discovery that memory is a distinct cerebral function independent of other cognitive skills, and that the medial temporal lobe plays an important role in memory formation but is not where long-term memories are stored. In 1957, Scoville and Milner introduced Patient H.M. to the world in a landmark paper. In the years following, countless papers have been written about Henry Molaison. Although his decision to perform this specific surgery on Henry Molaison is debatable, Dr. Scoville's surgery led to the discovery of many groundbreaking and foundational principles of human memory.

Death and Legacy

Dr. Scoville’s boundless energy for neurosurgery and life was evident as he continued operating as much as he could into old age, seeking out new sports cars, and beginning a new family with a second wife. Tragically, Scoville

met an untimely end in 1984 while driving through New Jersey on his way to his brother-in-law’s birthday party. Many might have expected his death to result from an automobile accident due to his love of speed and of sports cars, but ironically he was only driving 25 to 30 miles per hour when struck by another car. In memory of his contributions, many awards have been named in his honor. His son, Dr. Barrett Scoville, presented the first William Beecher Scoville Award at the WFNs to Henk Verbiest of the Netherlands in 1993. This was a $10,000 award given to a neurosurgeon who has advanced the art and science of neurosurgery with technical innovations in new devices or operations. Later recipients included Patrick Kelly and Michael Apuzzo. The New England Neurosurgical Society continues to confer the Scoville Award to the best clinical paper presented by a resident, to honor Scoville’s lifelong involvement as its inaugural president and one of its founding members. At the University of Connecticut School of Medicine, his first endowed neurosurgery chair professorship was established in his honor.

Conclusions

Dr. William Beecher Scoville pushed the field of neurosurgery forward through his innovations, leadership in neurosurgical societies, mentorship, and psychosurgery. His controversial operation on Henry Molaison transformed memory science and helped uncover the role of the hippocampus. Although psychosurgery has now fallen out of favor, selective ablations are still being used in the surgical management of seizures. He left behind a legacy of myriad new instruments and techniques, the next generation of preeminent trainees, flourishing neurosurgery organizations, hundreds of subjects lobotomized, and countless lives saved.

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