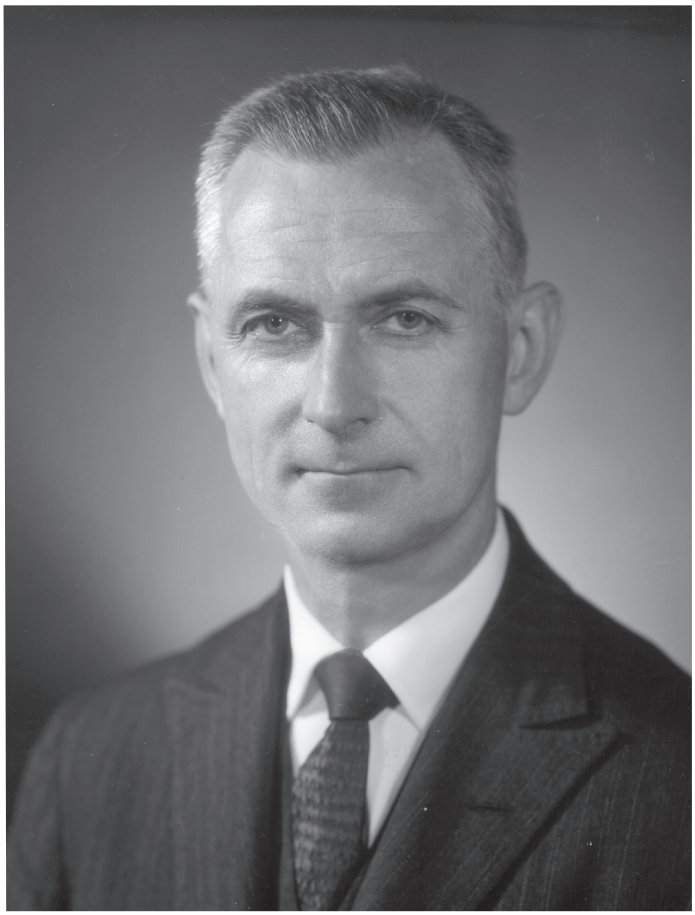
THE FACULTY OF MEDICINE
Harvard University

William Herbert Sweet



William H. Sweet, Professor of Surgery, *Emeritus*, Harvard Medical School and former Chief of the Neurosurgical Service, Massachusetts General Hospital, died on January 22, 2001. He was 90 and had had a career matched by few others in his chosen specialty. He was one of the great figures in world neurosurgery, that specialty of surgery that deals with diseases of the brain and its coverings, the spine and spinal cord, and the blood vessels to these structures. His life was characterized by an unswerving dedication to truth and scientific progress, intense intellectual activity, and an unwavering belief that we can understand and cure human disease. He made particular contributions to the study of brain tumors, pain, cerebrospinal fluid physiology and brain imaging.

Born in Kerriston, WA, on Feb 13, 1910, William Sweet graduated first in his class from the University of Washington in 1930 and entered Harvard Medical School the next year. In his second medical school year, he was awarded a Rhodes scholarship and spent two years at Magdalen College, Oxford University. He then returned to Harvard and received his M.D. degree in 1936. He trained in neurology and neurosurgery with Percival Bailey at the Billings Hospital at the University of Chicago. In 1940 he joined the neurosurgical staff at the Massachusetts General Hospital.

His work was interrupted when he joined the British Emergency Medical Services in 1941 as a volunteer, serving until 1945. In 1946 he became board certified in both Neurology and Neurosurgery. He then resumed his career in academic neurosurgery at Harvard as a staff neurosurgeon at the MGH, and concurrently as the first Chief of the Neurosurgical Service at New England Medical Center. In 1961 he became Chief of the Neurosurgical Service at the Massachusetts General Hospital following his mentor, James White. During more than sixty years of service at that hospital, he made significant contributions to both basic research and clinical care in neurosurgery. From his first published paper in 1938 to his last in 1999, his bibliography of 538 articles, chapters, and monographs reflects the broad range of his interests, the variety of his innovations, and his continuing development over time. His reporting is noteworthy for

his honest assessments of his failures as well as of his successes. His basic and clinical studies improved the care of patients with chronic pain, disorders of the cerebrovascular system, cerebrospinal fluid disorders, and brain tumors. In chronic pain, he described new techniques for treating facial and spinal pain; in vascular neurosurgery, he was a pioneer in the application of hypothermia to the management of brain hemorrhage and developed techniques for treating brain aneurysms; in cerebrospinal fluid disorders he helped to clarify the concept of normal pressure hydrocephalus; and in brain tumors he created the new fields of isotope imaging and neutron and proton radiation therapies. In a landmark collaborative effort having far-reaching ethical and medical importance he was, with Henry Beecher and others, a central figure in defining criteria for the diagnosis of brain death.

Sweet was one of the first academic neurosurgeons to stress the importance of including basic research in a clinical neurosurgical department. Having set up the laboratories for his own lines of investigation, he brought in others to pursue their work in the departmental framework – including among others Adelbert Ames, III, a basic scientist in neuronal ischemia, Humberto Fernandez-Moran in electron microscopy, and Albert Soloway in boron chemistry. In an early departure from the customary clinical focus of neurosurgical training, his program was redesigned and lengthened to provide residents with required periods devoted to purposeful laboratory experience. The belief that neuroscientists had an important place in neurosurgery became a model for a few leading departments in the country and contributed significantly to the neuroscientific revolution that has remarkably changed our approach to neurosurgical disease. His active participation in neuroscience included joining with F.O. Schmitt of M.I.T. to create the Neuroscience Research Program which led ultimately to the recognition of neuroscience as one of the most important and exciting areas of biomedical research.

Perhaps his major contribution to applications of science in medicine was his commitment to the interface of radiobiology and neurosurgery. In the 1940s he began investigating biological applications of particle physics and radioactive isotopes to human diseases. In 1951 he established one of the first radioisotope brain scan research laboratories in the country, which was the first such laboratory to be utilized routinely for clinical localization in the diagnosis of focal brain tumors. He gathered around him a cadre of brilliant physicists interested in medical applications of nuclear physics, and in 1953, with Gordon Brownell, he invented the positron emission tomography scan, or PET, which has become an invaluable instrument in body and brain imaging. During this same period he applied his interest in harnessing atomic energy for therapy by developing the concept of boron neutron capture therapy. This innovative therapeutic modality used the capacity of neutrons to destroy tissue that had boron uptake. It was an intriguing concept that is still being developed today to treat malignant gliomas of the brain. Later, he was central to creating the proton therapy unit at Harvard, a unit that has now become the Northeast Proton Therapy Center. It was typical of Sweet's leadership that he gave the proton project over to junior colleagues to pursue its full development

His interest in atomic energy was strengthened by his relationship to Associated Universities Inc (AUI), a non-profit, university-based research management organization that founded and operated Brookhaven National Laboratory and the National Radio Astronomy Observatory, the world leader in all phases of radio astronomy. Designated by the President of the University to represent Harvard on its board, Sweet had an active relationship with AUI for nearly forty years, first as a Trustee and later as an Honorary Trustee. Longtime AUI Board Chairman, Robert Hughes, described the depth of this relationship:

"Dr. Sweet was immersed in all aspects of AUI's scientific programs and its

> governance and policy responsibilities. He rarely missed one of the quarterly two-day Board meetings or the annual two-day Brookhaven Visiting Committee meetings of both the Medical and Biology Departments. The Board was composed of very distinguished scientists representing a broad range of disciplines. His interests and participation included not only the medical and biological programs, but also actively encompassed areas of high-energy particle physics, nuclear physics synchrotron radiation applications as well as astronomy and cosmology. This immersion was not merely tutorial but rather, it was purposeful- the purpose, ever on the table, to be supportive of the best interests of the AUI laboratories and of the science community. Diversity, breadth, depth, and purposefulness - an apt description of Dr. Sweet's 'approach to life'."

Dr. Sweet's scientific interests included many other important areas of brain function. His work on the physiology of cerebrospinal fluid formation and dynamics led to a D.Sci. degree from Oxford University. In this field, he was a pioneer in the development of the concept of idiopathic normal pressure hydrocephalus, a mysterious condition in which elderly patients lose memory, gait, and bladder function with ventricular enlargement; and with neurologists Solomon Hakim (Bogotá, Columbia) and Raymond D. Adams, Chief of Neurology at the MGH, he contributed to the first recognition that this constellation of symptoms had diagnostic significance.

In the field of intractable chronic pain, he introduced the use of electrical stimulation to suppress sensory pain mechanisms. In the field of facial pain, his pioneering techniques included radiofrequency lesions of the trigeminal nerve to relieve the agonizing pain associated with tic douloureux. Many of his trainees remember Sunday and holiday afternoons in the Picker Suite, a neuroradiology suite, which allowed image-guided placement of electrodes to relieve this condition. Utilizing local anesthesia, Sweet would carry out these procedures in sessions that exemplified his energy and tenacity. With James C. White, he co-authored two monographs that have become classic texts on the management of pain problems, Pain: Its Mechanisms and Neurosurgical Control (1955) and Pain and the Neurosurgeon: A Forty Year Experience (1969). Later, with Jan Gybels of Belgium, he wrote another classic text on pain, Neurosurgical Treatment of Persistent Pain: Physiological and Pathological Mechanism of Human Pain (1989).

Not only did his patients benefit from his superb surgical skills but he taught these skills to neurosurgical residents who are now practicing throughout the world. Many of these trainees carry on advances that he pioneered in the field of neurosurgery. He also provided an active fellowship program to help the improvement of neurosurgical care in other countries. In special recognition of this program's contribution to the development and progress of neurosurgery in Japan, he received the Emperor of Japan's Order of the Rising Sun in 1983. In consequence of his wide-ranging contacts and his familiarity with important work going on around the world, he was invited to co-edit with Henry W. Schmidek the first three editions (1982, 1988, and 1995) of the textbook, Operative Neurosurgical Techniques: Indications, Methods, and Results. These were the first such compendia to include chapters by emerging international contributors, and successive editions were steadily updated to report on new development wherever they occurred.

Dr. Sweet was an active participant in the major national and world neurosurgical and neuro-scientific organizations, serving as the president of some. He was an Honorary President of the World Federation of Neurosurgical Societies. He was a founder, officer, and later an Honorary Member

of the International Association for the Study of Pain and The American Pain Society. He served on Study Sections and Advisory Committees of the National Institutes of Health and was a member of the Scientific and Technology Advisory Committee of NASA's Office of Manned Space Flight. He was a Senior Member of the Institute of Medicine of the National Academy of Sciences, a Fellow of the American Academy of Arts and Sciences and a Trustee of The Neurosciences Institute (San Diego).

For his accomplishments he received the highest awards given in the field of Neurosurgery in this country including: Honored Guest of the Congress of Neurological Surgeons, the Cushing Medal of the American Association of Neurological Surgeons, and the Distinguished Service Award of the Society of Neurological Surgeons. Other honors included
Honorary Fellow of the Royal College of Surgeons (Edinburgh) and honorary degrees from Université Scientifique et Médicale de Grenoble (France) and The Ohio State University.

As well as being an accomplished neurosurgeon and academician, Dr. Sweet had a profound effect on his children. At his funeral, his son David said, "In my eyes, he was the pattern of all virtue. I didn't understand just what virtue was until much later when my feelings were captured and given concrete form as I read the great classical authors. They all agreed with each other and revealed that courage, temperance, justice and wisdom were the primary human virtues…when they described a good man, they described father."

It is only now, a generation after his ascendancy that we can begin to assess Sweet's full impact. At the beginning of his career in the 1930s, neurosurgery was a fledgling specialty, and there was little interaction between its clinical practitioners and neuro-investigators. Over the next sixty years, his innovations in diagnosis and surgical techniques, combined with his insistence on the integration of clinical and research efforts, contributed significantly to neurosurgery's progress to becoming a mature discipline. Throughout his career his keen mind and high standards had immense influence on those who worked with him and who trained under him. His clinical and research trainees have assumed major positions in France, Italy, Switzerland, Japan, Korea, Thailand, and Taiwan as well as in the Americas. He has, therefore, left a remarkable legacy in neurosurgical and neuroscientific leadership round the world.

He is survived by David, Gwen, and Paula, the children of his first marriage, and by his second wife, Elizabeth, who for twenty-three years provided encouragement and support for his professional efforts and anchored the happy equanimity of his home.

Respectfully submitted,

Peter M. Black, *Chairperson*
Robert E. Hughes
Robert L. Martuza
David B. Nathan
David R. Sweet
Daniel C. Tosteson
Nicholas T. Zervas