



Historical profile

Wilder Graves Penfield

Neurosurgeon whose scientific contributions span epilepsy to cortical representation.

A great sportsman and a pioneer of functional neurosurgery, he was born in Spokane, WA, USA, on Jan 26, 1891, and died in Montreal, Canada, on April 5, 1976, aged 85 years.

When Wilder Graves Penfield was eight years old, his father, Charles Samuel Penfield, abandoned the family. His mother, Jean Jefferson, then moved with her children to Hudson, in Wisconsin, where she founded the Galahad School for Boys. Penfield received his secondary education in this school, and eventually attended Princeton University (NJ, USA).

Although he first studied philosophy, Penfield ultimately decided to pursue medicine, the profession of both his grandfather and father, because that seemed to him the most direct way to "make the world a better place in which to live". To pay for his medical education, he coached the Princeton freshman football team. At that time, he was awarded a Rhodes Scholarship and was accepted to Merton College (University of Oxford, Oxford, UK) to study medicine. The College granted him special permission to defer his entrance until the end of the autumn of 1914, so that he could fulfill his agreement to coach the Princeton Varsity football team. Before moving to Oxford, he also managed the baseball team, excelled at wrestling, and worked his way up to first string tackle in the football team, all while maintaining outstanding academic qualifications.

At the University of Oxford, Penfield met the two great physicians who most influenced his career path: Charles Scott Sherrington, a neurophysiologist who won the Nobel Prize in Physiology or Medicine in 1932 for the study of reflexes and muscle innervation, and William Osler, a pathologist who is now considered one of the fathers of modern medicine. Subsequently, Penfield entered the Johns Hopkins University School of Medicine (Baltimore, MD, USA), where he finished his degree in 1918. He then completed an internship in Boston (MA, USA) under the guidance of neurosurgeon Harvey Cushing. After returning to the UK to complete a research fellowship at the National Hospital for Neurology and Neurosurgery in London, in 1921 he accepted a post as Associate Professor in Surgery at Columbia University (New York City, NY, USA).

However, after a few years in New York City, he felt that the best place to carry out his research ambitions was

Canada, specifically at McGill University (Montreal, Quebec, Canada), where he moved in 1928, and where the Montreal Neurological Institute (MNI) would open in 1934. At McGill and the MNI, Penfield mapped brain responses to electrical stimulation in the course of bringing therapeutic relief to conscious patients under local anesthesia, and catalogued a great quantity of information about brain physiology. He also recorded important observations on basic functions, such as language, sensitivity, and motility, and on their preservation.

In collaboration with his colleague Herbert Jasper, Penfield also created what is now known as "the Montreal procedure", by which patients with drug-resistant epilepsy were treated while conscious, so that the relevant brain areas could be targeted accurately during surgery, thus reducing side effects and complications. Through his work in mapping the cerebral cortex via stimulation, Penfield created the so-called homunculus. Even today, the homunculus is used in neurophysiology as a cortical representation of various parts of the human body. Penfield retired from the McGill medical faculty in 1954, and gave up his directorship of MNI six years later.

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For more on **Wilder G Penfield and his legacy** see *J Neurol* 2008; **255**: 11040–45, and *CMAJ* 2011; **183**: 1627

For more on **Penfield's contributions on epilepsy and brain function** see *Epilepsy Behav* 2012; **24**: 311–13

For more on "**the Montreal procedure**" see *J Neurosurg* 1991; **75**: 821–02

For more on the **homunculus** see *Nuncius* 2012; **27**: 141–62



Homunculus display at The Natural History Museum in London (UK)