VERNON B MOUNTCASTLE (15 July 1918 - 11 January 2015)

Honorary Member 1986

Vernon Mountcastle, who died aged 96, was elected Honorary Member of The Physiological Society in 1986. He was a distinguished neuroscientist who discovered the function of the columnar structure of the cerebral cortex. Although the six-layered structure of the neocortex was well established, when Mountcastle started his studies in the 1950s almost nothing was known about how the cortex processed its inputs and outputs. His discovery of functional cortical columns, with each column dealing with sensory inputs having shared characteristics, such as modality or spatial organisation, was radical and revolutionised future research in the field.

Vernon Mountcastle spent his entire academic career at Johns Hopkins, Baltimore. He went to the Medical School and trained as a surgeon, but he had only just qualified in 1942 when he was ordered to join the US Navy Medical Corps, and he subsequently saw action in both the Anzio and Normandy invasions. He intended to take up neurosurgery after the war, but instead he joined the Department of Physiology, headed by Philip Bard, and trained to be a neurophysiologist with Elwood Henneman. He used single microelectrodes to explore the somatosensory cortex of anaesthetised cats and monkeys. The columnar nature of the cortical organisation was readily demonstrated by comparing electrode tracks made vertical to the cortical surface, in which all the cells encountered responded to similar modalities of stimulation and had overlapping receptive fields, with tracks made horizontally across the cortex, in which successive blocks of cells with differing properties were recorded.

Mountcastle recognised that working on anaesthetised preparations represented ‘an abnormal state and that progress depended upon work in the waking, behaving animal’. He soon adopted the approach of recording in the awake monkey, and, at first, used this model to return to the study of the somatosensory cortex. However, the big step came when he began recording in posterior parietal cortex, and found for the first time evidence of sensory responses that were dependent on whether or not the monkey attended to the stimulus. Mountcastle was a stickler for good experimental design, and he quickly developed more formal and rigorous tests to develop these early discoveries. Many years of research, carried out by Mountcastle and his pupils, have led to major advances in our knowledge of how the parietal cortex functions as a multisensory model of our external world, one that provides the reference system for all our actions within that world.
Mountcastle trained a great many students and postdoctoral fellows and his lab was famous in producing future leaders of neuroscience, including Apostolos Georgopoulos, Richard Andersen, Michael Merzenich, Ken Johnson, Carlos Acuna, Rodolfo Romo and Gian Poggio.

Mountcastle was a founding member of the university’s Zanvyl Krieger Mind/Brain Institute, where he continued to work until his retirement aged 87. His textbook of Medical Physiology was familiar to many students of physiology and medicine.

Vernon Mountcastle was elected to the National Academy of Sciences in 1966. He was the second President of the Society for Neuroscience in 1971. In 1978, he received the Louisa Gross Horwitz Prize from Columbia University together with David Hubel and Torsten Wiesel. In 1983, he was awarded the Albert Lasker Award for Basic Medical Research. He also received the United States National Medal of Science in 1986. In 1998, Mountcastle was awarded the NAS Award in the Neurosciences from the National Academy of Sciences.

In 1981, Hubel and Wiesel, who, together with Sperry, won the Nobel Prize in Physiology and Medicine for their work on cortical columns in the visual cortex, acknowledged Mountcastle’s seminal ideas as the basis of their work: ‘The discovery of columns in the somatosensory cortex was surely the single most important contribution to the understanding of cerebral cortex since Ramón y Cajal.’ It was an open secret that Mountcastle was hugely disappointed at not being included in that Prize.

Three generations of brain scientists knew Dr Vernon Mountcastle as a formal, soft-spoken man, always very serious, patient and engaged. He will be remembered for his many and varied contributions to modern neurophysiology and neuroscience.

Roger Lemon, UCL