

Harvey Cushing: father of modern neurosurgery

It is unusual in medicine to be able to give a single name to the founder of a particular speciality. However, I doubt if anyone would argue that Harvey Cushing was not the man who, almost single-handedly, created modern neurosurgery. This year marks the 75th anniversary of his death, in 1939.

Cushing was born in Cleveland, Ohio in 1869. His father was professor of obstetrics and gynaecology at the local university, Western Reserve, and Harvey was the fourth generation of Cushings to follow a career in surgery. He took an arts degree at Yale University, then studied medicine at Harvard, qualifying doctor of medicine in 1895.

After being house surgeon at the Massachusetts General Hospital, he went to the Johns Hopkins Hospital, Boston as junior assistant to William Halsted, the professor of surgery, in 1896. Halsted was a scholarly, shy man. He practised a meticulous, time-consuming surgical technique, which stressed complete haemostasis and the gentle handling of tissues. (Among other contributions, Halsted introduced the use of sterilized rubber gloves and devised the operation of radical mastectomy for breast cancer.) This tradition of infinite care and patience was passed on to Cushing in his later neurosurgical practice.

At Hopkins, Cushing met William Osler, then professor of medicine, before Osler's move to Oxford. They became lifelong friends. Many years later, on Osler's death, Cushing spent 5 years of his early morning spare time writing a two-volume biography of Osler – it won the Pulitzer Prize.

While at Baltimore, Cushing took the first clinical X-rays at Hopkins and also introduced the first anaesthetic chart, standard practice today, to monitor the patient during surgery.

In 1900, Cushing spent a fruitful year in Europe. He worked with Theodor Kocher in Berne (who won the Nobel Prize for his work on thyroid surgery), and here dem-

onstrated in dogs that a rise in intracranial pressure produces a rise in arterial pressure (the Cushing reflex). In Liverpool, Cushing assisted Sir Charles Sherrington in his delineation of the motor cortex in apes; Cushing's surgical expertise proved invaluable in these important studies.

On returning to Baltimore in 1902, Cushing asked to be allowed to specialize in the surgery of the brain and spinal cord. Halsted recommended orthopaedics! Many of the senior surgeons thought that Cushing

'Cushing spent 5 years of his early morning spare time writing a two-volume biography of Osler – it won the Pulitzer Prize.'

was ruining his promising prospects as a surgeon by his strange choice. However, Cushing persisted and slowly built up a specialist practice – mostly surgery for trigeminal neuralgia. His early results with brain tumours, at first terrible, gradually improved; he introduced subtemporal decompression as a palliative procedure.

In 1912, Cushing was appointed professor of surgery at Harvard and surgeon in chief at the new Peter Bent Brigham Hospital, Boston. Over the years, the foundations of modern neurosurgical operative technique were established – the use of silver clips (Cushing's clips) to control cerebral blood vessels, the application of the surgical diathermy machine to neurosurgical operations, the layered closure of scalp wounds and so on.

During the first World War, Cushing spent two periods as a neurosurgeon on the Western Front, first with the French army, then, when the USA entered the war in 1917, with a special American neurosurgical team. Here he established the principles of the treatment of penetrating brain wounds – including the use of the sucker to remove pulped brain tissue and the electromagnet to remove ferrous metallic foreign bodies.

Returning to Boston, Cushing perfected his meticulous technique for cerebral surgery (operations could take up to 10 hours),

and accumulated a unique experience of brain tumours, with an operative mortality that fell to 5% in the days of fairly basic anaesthetics and no antibiotics. He wrote important monographs on the subject, including a major treatise on the meningiomas, and described the endocrine effects of pituitary tumours – earning the eponym of 'Cushing's syndrome'. He was a consummate artist, his books and articles were illustrated with his own drawings.

Surgeons came from all over the world to train under him, among them a young Australian, Hugh Cairns who later became professor of surgery at Oxford. I worked for Cairns as a young surgeon so I suppose that I can claim Harvey Cushing as my surgical grandfather!

Cushing retired from surgical practice in 1932 – a heavy smoker, he had by now developed severe leg claudication – and went back to his old university, Yale, as professor of neurology and director of studies in the history of medicine (he was an authority on the anatomist Vesalius). Here he completed his major monograph on the meningiomas.

Cushing died on 7 October 1939, a few days after being admitted to hospital with a coronary thrombosis and heart block. He was a great man – surgeon, pathologist, historian, teacher and artist – but, as you can imagine, a difficult man as well. He expected the highest standards from those who worked for him. He demanded the strictest discipline in the operating theatre, where operations were performed, hour after hour, in complete silence, broken only by severe criticism on the part of any wayward assistant. Ward rounds went on and on; dressings were done by the surgeon himself.

I mentioned already that Hugh Cairns, my professor of surgery, spent a year as Cushing's assistant. Cairns had served in the First World War both in the Dardanelles and on the Western Front. He used to tell us that Gallipoli and the battle of the Marne were nothing compared to working as Cushing's assistant! **BJHM**

Conflict of interest: none.

Professor Harold Ellis is Emeritus Professor of Surgery, Guy's, King's and St Thomas' School of Biomedical Sciences, London SE1 1UL