John Hughlings Jackson: a pioneer of modern neurology

Every doctor is familiar with the term 'Jacksonian epilepsy', which can be defined as 'a focal seizure involving spastic contraction of peripheral muscles and spreading centripetally, initially confined to one limb but sometimes proceeding to a generalised fit with loss of consciousness'. Few, however, would be able to tell anything if at all about the man behind the name. This year marks the 100th anniversary of his death.

John Hughlings Jackson was born in 1835 in Providence Green, a village outside York; his father was a farmer and brewer. After education at the local schools, John was enrolled in York Medical School, which then boasted about a dozen pupils, but which had among its past alumni Jonathan Hutchinson, later to become a surgeon of great distinction at the London Hospital and a good friend of Hughlings Jackson.

From York, Hughlings Jackson came to St. Bartholomew's, studied under Sir James Paget and qualified at the age of 21 years with his Membership of the Royal College of Surgeons and Licentiate of the Society of Apothecaries in 1856.

He returned to York as house surgeon to the York Dispensary then, 3 years later, came to London with a letter of introduction to Hutchinson, who had him appointed lecturer in pathology at The London and physician to the Metropolitan Free Hospital. The following year, 1860, he obtained his Doctor of Medicine St. Andrew's and his Membership of the Royal College of Physicians and in 1862 was appointed assistant physician at The London, becoming full physician in 1874. He also joined the staff of Moorfields and became proficient with the ophthalmoscope, whose use he was to help popularize in English neurology. He said later: 'I think it is the luckiest thing in my medical life that I began the scientific study of my profession at an ophthalmic hospital'.

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Meanwhile, The Hospital for the Paralysed and Epileptic opened at Queen Square in 1860, with Charles Brown-Séquard as its first physician. He wrote in *The Lancet* the following year: 'The brain is composed of distinct organs, each of which gives rise to a distinct function'. In 1862 he appointed Hughlings Jackson as his assistant physician.

Hughlings Jackson took Brown-Séquard's views still further and developed the concept that, for the purposes of clinical neurology and experimental physiology, the nervous system is exclusively a sensorimotor machine, and no reference to metaphysical agents or actions was necessary. His ideas were much influenced by the demonstration by Gustav Fritsch and Edouard Hitzig that stimulation of the exposed frontal lobes of dogs evoked movement of different parts of the body, depending on the area of cortex that was stimulated; work that was extended by the studies of David Ferrier on the monkey's brain.

Hughlings Jackson's own studies were based on the most meticulous recordings of the clinical details of the history and examination of his patients and their correlation, whenever possible, with subsequent autopsy examination.

By 1881, Hughlings Jackson had developed an evolutionary concept of the development of the CNS into three hierarchical levels: the lowest represents the parts of the body most directly – the spinal cord, medulla, pons and the cranial motor nerve nuclei (more or less the whole of the developed nervous system in the newborn). The middle level is represented by the motor cortex and basal ganglia, while the highest level is the premotor frontal cortex.

He wrote: 'Evolution is a process from the most automatic to the most voluntary, from the simple to the complex, from the general to the special. As we proceed upwards the centres have more power of controlling the lower and are more independent of them. There is a multiplication of both fibres and cells from the lowest to the middle and highest centres. More fibres mean less paralysis from an equal-sized destruction, but, on the other hand, as there are more ganglion cells, the convulsion will be the stronger from the higher centre'.

When neurological functions are affected progressively, he pointed out that the first affected are those that are most highly developed. Dissolution leads to freeing of the lower centres which results in their excessive activity, for example, the spastic paralysis which follows a cerebral cortical motor lesion.

Hughlings Jackson was, of course, particularly interested in the careful study of epileptic fits. Fits which begin unilaterally most often commence in the hand, rarely the arm and less often the lower limb. Fits begin in the part which has the most varied use and which will be represented on the cerebral cortex by the largest number of ganglion cells. This form of epilepsy was regarded by Hughlings Jackson to arise from the middle level of his CNS classification. What Hughlings Jackson called 'genuine epilepsy' he considered to arise in the highest centres and to spread to the lowest. He gave due credit to Richard Bright and Samuel Wilks, both of whom had described focal brain lesions giving rise to local spasms.

Hughlings Jackson had a retiring character, and was rather a lonely man after his wife died in 1876 after 11 years of marriage He was grave and dignified (he was known affectionately as 'The Sage'), and was practically unknown outside the medical world. His scientific work, with over 200 published papers, was marked by his election as Fellow of the Royal Society in 1878. The great neurologist Jean Charcot hung Hughlings Jackson's portrait in his consulting room.

Hughlings Jackson died of pneumonia in his house in Manchester Square, London on 7 October 1911 at the age of 76 years. **BJHM**

Conflict of interest: none.