

## HISTORICAL NOTE .....

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## Otfrid Foerster (1873–1941): one of the distinguished neuroscientists of his time

Otfrid Foerster, German neurologist and neurosurgeon, made innovative contributions to neurology and neurosurgery. He was born in Breslau (now named Wrocław, Poland). He attended the St Maria Magdalena Gymnasium in Breslau and graduated from there in 1892. From 1892 to 1896 he studied medicine at the universities of Freiburg, Kiel and Breslau, graduating from Breslau in 1896. In 1897, at the age of 24, he completed his doctoral studies on typhoid fever, the only one of his studies not connected directly with the nervous system. Foerster was profoundly influenced by Carl Wernicke (1848–1905). By cooperating with Wernicke, Foerster's interest in the anatomy of the central nervous system was excited. Following a suggestion by Wernicke, he went to Paris and remained there for 2 years as a pupil of Jules-Joseph Déjérine (1849–1917), Pierre Marie (1853–1940) and Joseph François Felix Babinski (1857–1932). After his return to Breslau he collaborated with Wernicke in his published atlas of brain sections issued in 1903.<sup>1</sup> In 1908 he was appointed professor extraordinarius and in 1911 he established the first department of neurology separate from psychiatry in Germany.<sup>2</sup>

In 1908, Foerster developed an operation to cut the posterior sensory root in order to alleviate spasticity (Foerster's operation). The involvement of spinal reflexes in the genesis of muscular spasticity suggested its possible treatment by surgical interruption of the sensory branches of the thoracic and lumbar nerves (rhizotomy). Foerster's studies on posterior rhizotomy led to the determination of dermatome borders. In 1912, Foerster and Alexander Tietze (1864–1927), the German surgeon, transected the spinothalamic tract for intractable pain, unaware that this procedure had been performed by William Gibson Spiller and Edward Martin several months earlier. After World War I, Foerster published his innovative results concerning war injuries, the surgical treatment of nerve damage by shot wounds and other types of spinal cord and brain damage.<sup>1</sup>

Although not a surgeon, he operated on numerous patients with spinal cord and peripheral nerve lesions during World War I. Thereafter, he became a neurosurgeon. After the war, veterans presented to him with cerebral injuries causing epilepsy. Foerster resected the epileptogenic areas, identified using galvanic cortical stimulation under local anaesthesia. This made possible the maximal excision of scarred cortex without damage to vital areas. Foerster continued the detailed mapping of the human cortex using local anaesthesia so that the patient could report sensory responses during the operation. In 1928, Wilder Penfield (1891–1976) spent 6 months with Foerster in Breslau; he was particularly influenced by Foerster and continued Foerster's lifework on the analysis of the brain cortex and the study of epilepsy. They published their results on surgery to treat traumatic epilepsy.<sup>3</sup> Foerster also performed the first electrocorticographic studies with Altenburger in 1935.<sup>4</sup> Other milestones included the hyperventilation test in patients with epilepsy<sup>5</sup> and the description of the atonic–astatic form of infantile cerebral palsy.<sup>6</sup>

Although he faced many obstacles, he insisted on living for many years in Breslau. Breslau became a training centre for neurologists and neurosurgeons. Between the two world wars, many internationally well known scientists, Wilder Penfield (1891–1976), Percival Bailey (1892–1973), Paul Bucy (1904–1993), Robert Wartenberg (1897–1956), Herbert Mclean Evans (1882–1971) and Harold Leeming Sheehan (1900–1988), studied under his supervision and made important contributions to neuroscience.

His most famous patient was Vladimir Ilyich Lenin. Lenin died in 1924, having suffered from strokes in his last two years. The Soviet government invited Foerster as a specialist to attend Lenin during his illness, and Foerster was appointed Lenin's personal physician. Foerster lived in Russia from 1922 to 1924, and was a great admirer of Lenin's personality and political achievements. After Lenin's death, Foerster participated in the autopsy and Lenin's brain was removed before his body was embalmed. Foerster was asked to suggest the name of a scientist who could examine Lenin's brain and he named the German neuroscientist Oskar Vogt to locate the neurons that are responsible for genius.

Foerster made major contributions to neuroscience. His investigations included studies on the disorders of mobility and sensation, localisation, muscle physiology, epilepsy, brain tumours and pain. His blending of physiology, neurology and neurosurgery was instrumental in his creating his world famous cytoarchitectonic map of the human cerebral cortex.<sup>7</sup> He was nominated several times for the Nobel Prize in Physiology or Medicine but never received it. Foerster was honoured posthumously by German neurosurgical and neurological societies as *persona non grata*. In his last years during the Nazi regime, his activities were restricted because of his association with Russia as Lenin's physician and his wife's Jewish ancestry. At that period, he was forced to stop his subscriptions to foreign journals and accepted a position on the advisory board of the *Journal of Neurophysiology*.<sup>6</sup> Lacking government funding, he underwrote his own research expenses for 30 years until the Rockefeller Foundation provided financial support in 1930.<sup>2</sup> With financial support from the Rockefeller Foundation and the support of the State of Prussia, Foerster was able to open a new Institute of Neurological Research in 1934 which later was renamed after him (the Otfrid Foerster Institut für Neurologie).

Foerster and his wife Martha suffered from tuberculosis and were treated in a sanatorium in Switzerland. He succumbed to tuberculosis on 15 June 1941 and Martha followed a day later; they are buried together in Breslau. In 1953, the Otfrid Foerster award was created by the Deutsche Gesellschaft für Neurochirurgie, and one of his pupils, Percival Bailey, received the first medal.<sup>2, 8</sup>

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