

Henri Duret (1849–1921)

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Henri Duret was born in the township of Condé-sur-Noireau in Northern Normandy on 7 July 1849. He brilliantly finished the Marist College and entered the medical school in Caen. At the outbreak of the Franco–Prussian War of 1870–1871 he served as a surgeon-aid. In recognition of his outstanding service he was recommended for the Legion of Honor.

After his return to Paris Duret followed the competitive course of academic surgery in Paris, up to the rank of *Chef de Clinique* for the professor of surgery Verneuille. During these years Duret worked in the laboratories of Vulpian and Charcot where he studied, first with Carville and later on independently, the localization of voluntary motor functions in the cerebral cortex in experimental animals. He mastered a technique for producing well-circumscribed

cortical lesions and he also used a specially devised curette for creating deep lesions with minimal trauma. Another innovation was to use faradic instead of galvanic currents to stimulate the cerebral cortex. This work, internationally acclaimed, supported the concept of an integrated somatosensory cortex and drew attention to the possibility of partial recovery from the effects of the cortical lesions; this was in contrast to deeper lesions, which produced permanent impairments [1].

It seems that Duret was endowed with outstanding vigor. In parallel with the neurophysiological project he started a major study of the cerebral vasculature [2]. By studying different mammals he could show that already in the fetal stage it is possible to discern a common pattern of the blood supply to the brain, including the territories of major arteries. In a meticulous exploration of the smallest blood vessels he proposed the notion of ‘nourishing arteries’, a type of vessel that had been neglected by the classical neuroanatomists. He demonstrated that these tiny vessels emerged from large or medium-sized arteries and penetrated the brain from the circle of Willis, up to the basal ganglia (one of these arteries is named after Heubner), and from the basilar trunk into the brainstem tracts and nuclei. The preservation of these minute arteries would later become of utmost importance during aneurysm surgery, dramatically influencing the neurological outcome, including cognition. Duret studied the blood supply of the cerebral cortex and demonstrated a system of anastomoses between the pial arterioles that could partly account for the recovery from cortical lesions. In 1878 he presented his celebrated doctoral thesis *Études expérimentales et cliniques sur les traumatismes cérébraux*. [3], introducing a new concept in the dynamics of head injury. He regarded all the spaces containing cerebrospinal fluid as a single unit, in which the traumatic forces were propagated along

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the neural axis. This ‘*choc céphalorachidien*’, or shock-wave theory, is acknowledged nowadays in many experimental and simulated models of craniocerebral injuries. According to Duret the shock wave in head injury is directed to the brainstem and the propelled cerebrospinal fluid distorts and disrupts its minute nourishing arteries, causing either subarachnoid hemorrhage and sometimes even ischemia or hemorrhage in the deep substance of the pons, medulla oblongata and in the floor of the fourth ventricle: ‘Duret’s Haemorrhage’. Since the advent of computerized tomography, Duret’s hemorrhage (an eponym coined by Theodor Kocher) has been found after any sudden, violent shift or herniation of the intracranial contents. In other words, the applicability of the *choc céphalorachidien* extends beyond head-injury. The microscopical studies of Duret confirm that he identified the lesions later recognized as ‘diffuse axonal injury’. Duret also paid much attention to the contribution of the rich innervation of the dura to its sensitivity and its role in the vagal reflexes associated with head injuries [4].

In the following years Duret completed two more major theses, for the competition for academic promotion, on the contraindications to surgical anesthesia by chloroform and on rare forms of inguinal hernia. A professorship of surgery in Paris was, however, denied to him. In the anticlerical atmosphere prevailing at the time, Duret’s devout Catholicism may have generated antagonism.

In 1885 Duret was elected to the professorship of surgery in the developing Catholic University in Lille, together with the chairmanship of the surgical services of the Hôpital de la Charité. He served three terms as dean of the faculty of medicine and led the expansion of the faculty’s medical and nursing services as well as the formation of learned societies in Lille. His numerous publications dealt with a variety of practical surgical problems. It is evident, however, that after leaving Paris he did not maintain the same outstanding scientific productivity in the neurosciences. It is plausible that his many other duties precluded this.

Nevertheless, Duret did not lose interest in the neurosciences; at the turn of the century he published several papers and a large monograph (over 800 pages) about intracranial tumours, one of the first of its kind. Duret not

only meticulously compiled the signs and symptoms for various cerebral locations but also described the diagnostic procedures and reviewed the surgical treatment, including surgical techniques, indications, complications and outcome of 400 cases treated by Continental, British and American surgeons who contributed their cases for his book [5]. This innovative and comprehensive book was not granted the acknowledgment it deserved and was not even mentioned by Cushing, who would later be regarded as the pioneer of modern neurosurgery. Duret himself operated on very few if any brain tumours; nevertheless, he is often referred to as ‘the French neurosurgeon’.

In 1920 Duret completed his magnum opus, a voluminous book on craniocerebral injuries in which he reviewed the accumulated experience in basic and clinical research [6].

Before his retirement Duret wrote about the miracles of Faith and on racial superiority [7]. None of these ideas are reflected in his scientific work. For his outstanding courage, achievements and devotion as Physician-in-Chief of the Red Cross during the harsh occupation of Lille (1914–1918) Duret was awarded the Cross of the Legion of Honor and was also highly decorated by the Catholic Church. He died on the 7 April 1921.

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