

# Medicine in Stamps

## Jean-Martin Charcot (1825–1893): pathologist who shaped modern neurology

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Charcot's pupil, Joseph Babinski, once declared, *"To take away from neurology all the discoveries made by Charcot would be to render it unrecognizable."* Before Charcot, textbooks provided only brief and inaccurate descriptions of the central nervous system, and classified as neuroses diseases like epilepsy, chorea and tetanus. Neurology as a discipline was non-existent.

Jean-Martin Charcot was a quiet and withdrawn child with artistic talents and an uncanny attention to visual details, qualities that later proved invaluable in his neurological investigations. He was admitted to medical school at the University of Paris, graduating in 1853. In 1857, Charcot was appointed professor of medicine and shortly thereafter became chief of medical services at the Sâlpêtrière Hospital, where he remained for the rest of his career. In 1872, Charcot was elected professor of pathological anatomy at the University of Paris, and in 1882, he assumed its newly-created chair of neurology.



**SÂLPÊTRIÈRE HOSPITAL.** The Sâlpêtrière Hospital was originally built by King Louis XIII as an arsenal to store gunpowder (Saltpeter was one of the ingredients of gunpowder, hence the name). Converted into a large public hospital in the 17th century, it housed mostly chronically-ill, indigent women. Paris literally dumped her rejects at Sâlpêtrière, including illegitimate children, prostitutes, the insane and incurables. In the 1860's, reorganisation of the French public health system led to reshuffling of patients, and Sâlpêtrière inherited those with rheumatological and neurological conditions. Little wonder Charcot himself referred to it as the *"grand asylum of human misery."* But unlike other physicians, Charcot did not despair over his patient population, declaring, *"We are in possession of a sort of living pathology museum of almost inexhaustible resources."* This population allowed Charcot to use

his method of anatomoclinical deduction in teasing out differences among neurological conditions, something other physicians were hitherto unable to do.

**THE ANATOMOCLINICAL METHOD.** Charcot was a pathologist by instinct and training, and like most French physicians, relied on the anatomoclinical method, first taught by Italian pathologist, Giovanni Morgagni (1682–1771), and later refined by French clinician, René Laennec (1781–1826). This approach, the basis for our modern day clinico-pathological conference, emphasised the correlation between clinical manifestations and post-mortem findings. Charcot first separated patients into clinical types based on their neurological presentation.

The majority of patients at Sâlpêtrière were wards of the State, and as no one claimed their bodies, Charcot was able to perform autopsies on virtually everyone who died. He then correlated post-mortem findings with clinical signs and symptoms, enabling categorisation of the different neurological types based on anatomical pathology. For example, Charcot and his colleague, Vulpian, were interested in tremors. Through the halls of Sâlpêtrière, Charcot grouped patients with tremors and noticed that they fell into two general types: those with resting tremor, and those with intention tremor. Charcot noted that the latter group had sclerotic plaques in the brain, whereas the former group did not. These observations allowed differentiation between multiple sclerosis and Parkinson's disease, a remarkable feat at that time.

**ACHIEVEMENTS.** Charcot had two main mentors. The first was Pierre Rayer, his medical school dean and professor of comparative pathology, and personal physician to Emperor Napoleon III. Known for his comprehensive study of kidney diseases, Rayer gifted to Charcot his passion for pathology (*"A physician is only as*

good as a clinician as he is as a pathologist"). His second mentor was his friend, Guillaume Duchenne, of muscular dystrophy fame. Charcot regarded Duchenne as his master in neurology, and allowed Duchenne access to research facilities at Sâlpêtrière. Duchenne taught Charcot bedside neurological testing and the use of photography, and left him his massive collection of pathological specimens. As a result, Charcot was able to study neuromuscular conditions in great detail, discovering among other things, peroneal muscular atrophy or Charcot-Marie-Tooth disease.

Charcot's most important contribution was arguably his numerous studies on cerebral and spinal localisation. Prior to Charcot, localising areas of specialised function in the human brain was extrapolated from animal studies, leading to many errors. Charcot relied on his anatomoclinical method to determine functional areas of the human brain. In a series of lectures in 1875, he declared that the brain was not a homogenous organ but rather a series of associated regions with specialised functions. He later published his meticulous mapping of the brain in *Leçons sur les localisations dans les maladies du cerveau*, which helped usher in the new age of neurosurgery and neuropathology.

Charcot excelled in both neurology and general medicine. He discovered amyotrophic lateral sclerosis (also called Charcot disease), neuroarthropathic joint disease associated with tabes dorsalis (Charcot joint), and miliary aneurysms in patients with cerebral haemorrhage (Charcot-Bouchard aneurysms). He also described gout as an entity separate from chronic rheumatism, and correctly identified ischaemia as the cause of intermittent claudication (Charcot syndrome). He described clinical triads for multiple sclerosis (nystagmus, intention tremor and scanning speech) and cholecystitis (jaundice, fever and upper quadrant abdominal pain). Charcot also worked on hysteria and hypnosis, and is recognised as one of the forerunners of modern psychiatry.

**TEACHER AND INSTRUCTOR.** By 1881, Europe recognised Sâlpêtrière as the centre of neurological studies. Charcot held popular and dramatic lectures in an amphitheatre, in which he would demonstrate clinical findings in his patients. He was especially skilled in pointing out the similarities and differences within and among the various maladies. Using his artistic abilities, he would then sketch on a chalkboard the anatomical regions associated with the disease. It has been said that "Everything in his lectures was designed to attract attention and to captivate the audience by means of visual and auditory impressions." He was even able to use his drawing skills in his investigations into hysteria.

A perfectionist and demanding taskmaster, Charcot was nonetheless supportive of and generous to his many students, counting among them such luminaries as Charles Bouchard, Joseph Babinski, Gilles de la Tourette, Édouard Brissaud, Gilbert Ballet, Mathis Duval, Pierre Janet and Sigmund Freud. In general, Charcot's students admired and revered him, and Sigmund Freud went as far as to name his son after him. One exception, Charles Bouchard turned antagonistic after Charcot helped him become professor of general pathology. Bouchard's hostility became apparent when he denied Joseph Babinski's nomination as professor of medicine simply because Babinski was a student of Charcot.

**PERSONAL LIFE AND DEATH.** Impatient and aloof, Charcot was said to be "cold, secretive, inscrutable and to exercise despotic authority". He married a rich widow, Madame Durvis, in 1862 and had two children, Jeanne and Jean Baptiste, the latter becoming both a doctor and a famous polar explorer.

Despite being a physician, Charcot was sedentary with poor health habits. He ate heartily and smoked cigars. These habits placed him at high risk for cardiac disease, and at 65, he developed angina pectoris. During this time, he also suffered from debilitating back pain that limited his ability to walk. Three years later in 1893, while on a trip with two of his pupils, he suffered a heart attack and died from acute pulmonary oedema. His death at age 68 deprived the world of a great scientist and clinician. Alone, he had transformed chaotic Sâlpêtrière into the 19th century's foremost neurological centre. Over the next 100 years, imaging studies in particular have deepened medicine's diagnostic reach into the human brain, but today's astute clinician continues to employ Charcot's unmistakable methods at the bedside in evaluating neurological disease.

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