Figures and Institutions of the neurological sciences in Paris from 1800 to 1950: Part III: Neurology

Les figures et institutions des sciences neurologiques à Paris de 1800 à 1950. Partie III: Neurologie

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Abstract

We present a short historical review on of the major institutions and figures that contributed to make Paris a renowned centre of physiology and neurology during the XIXth and the first half of the XXth century. We purposely chose to focus on the period 1800-1950, as 1800 corresponds to the actual beginning of neurosciences, and 1950 marks their exponential rise. Our presentation is divided into four chapters, matching the main disciplines that which have progressed and contributed the most to the knowledge we have of the brain sciences: anatomy, physiology, neurology, and psychiatry-psychology. The present article is the third of the four parts of this review, which deals with the chapter on and is about deals with neurology. A special account credit should be given to Jean-Martin Charcot who founded the Salpêtrière School of neurology and became one of the world's most important world neurologists of the XIXth century. We provide below the biographical sketches of Armand Trousseau, Guillaume Benjamin Amand Duchenne, Jean-Martin Charcot, Alfred Vulpian, Désiré-Magloire Bourneville, Paul Richer, Henri Parinaud, Albert Pitres, Jules Joseph Dejerine, Mrs. Augusta Dejerine-Klumpke, Edouard Édouard Brissaud, Pierre Marie, Georges Édouard Brutus Gilles de la Tourette, Joseph Babinski, André Thomas, Georges Marinesco, Achille Alexandre Souques, Georges Guillain and Charles Foix.

Résumé

Nous présentons une revue générale historique brève sur les principales institutions et personnalités ayant contribué à faire de Paris un centre renommé de physiologie et de neurologie au cours du XIXe siècle et de la première partie du XXe siècle. La raison du choix de cette période allant de 1800 à 1950 s'explique par le fait que 1800 marque les débuts des neurosciences, et 1950 leur développement exponentiel. Notre présentation est divisée en quatre chapitres, correspondant aux principales disciplines ayant progressé et contribué le plus

aux connaissances que nous avons sur les sciences du cerveau : anatomie, physiologie, neurologie, et psychiatrie-psychologie. Le présent article est la troisième des quatre parties de cette revue générale, qui porte sur le chapitre de la neurologie. Une mention particulière doit être faite à Jean-Martin Charcot qui fut le fondateur de l'École de Neurologie de la Salpêtrière et fut l'un des plus célèbres neurologues au monde du XIX^e siècle. Nous présentons ci-après les biographies résumées de Armand Trousseau, Guillaume Benjamin Amand Duchenne, Jean-Martin Charcot, Alfred Vulpian, Désiré-Magloire Bourneville, Paul Richer, Henri Parinaud, Albert Pitres, Jules Joseph Dejerine, Mrs. Augusta Dejerine-Klumpke, Édouard Brissaud, Pierre Marie, Georges Édouard Brutus Gilles de la Tourette, Joseph Babinski, André Thomas, Georges Marinesco, Achille Alexandre Souques, Georges Guillain, et Charles Foix.

Introduction

During the 19th c. XIXth and early 20th c. XXth centuries, clinicians, anatomists and pathologists performed a considerable work as regards neurology. Numerous authors from many parts of the world contributed to the development of this new discipline. A special account should be credited should be given to German speaking universities from Central Europe, institutions in Great Britain and North America, French and Italian neurological schools, and also medical universities from Belgium, the Netherlands, Scandinavia, Southern Europe, Russia and South America.

The purpose of the present article is to highlight the role of several physicians from Paris to the build-up of neurology. Of particular importance is the emblematic Jean-Martin Charcot (1825-1893) is of particular importance, as he who left his mark on French Neurology and became one of the most important world neurologists of the XIXth century. His works at the Salpêtrière hospital (Figure 1), the lectures he regularly gave, the renowned patients he treated, and his mundane activities made him a man "du tout Paris" (Parisian smart set). By When describing his work, one takes the full measure of the international impact the Salpêtrière School of Neurology and of the international impact it had at that time (Bogousslavsky, 2011). We wish now to present below - without being exhaustive - a biographical sketch of the most important masters who contributed to the reputation of Paris neurology.

Armand TROUSSEAU (1801-1867)

Trousseau (Figure 2) began his medical studies in his native city of Tours under the guidance of Pierre Bretonneau (1778-1862) (Bariéty, 1967; Lyons, 1976; Mayer, 1957; Pearce, 2002a; Peumery, 2003). Together with Bretonneau and Alfred Velpeau (1795-1867), they founded the medical school of Tours. Trousseau continued his studies in Paris and became a docteur en médecine (M.D.) in 1825. He was successively appointed professeur agrégé (1827), médecin des hôpitaux de Paris (1830) and professor of therapeutics (1839). He acceded to the chair of Clinique Médicale (Clinical Medicine) at the Hôtel-Dieu hospital in 1852 and was elected at the Académie de médecine (French National Academy of Medicine) in 1856. With his student Hermann Pidoux (1808-1882), he wrote *Traité de thérapeutique et matière médicale* (Treatise on Therapeutics) in 1836 with his student Hermann Pidoux (1808-1882) (Trousseau and Pidoux, 1836), and then with Belloc *Traité pratique de la phtisie laryngée, de la laryngite chronique et des maladies de la voix* (A Practical Treatise on Laryngeal Pphthisis, Cchronic Laryngitis, and Diseases of the Voice, 1837), on his own. (Trousseau and Belloc, 1837). Trousseau recommended and practised tracheotomy in croup and thoracocentesis in pleural effusion. His *Cliniques médicales de l'Hôtel-Dieu* (Lectures on Clinical Medicine, delivered at the Hôtel-Dieu, Paris, 1861), in which Trousseau made

several and greatly accurate clinical descriptions of neurological syndromes such as aphasia (Lebrun, 1993), tetany (Trousseau sign), movement disorders and tics, have been translated and re-edited many times (Trousseau, 1861; Rickards et al., 2010).

Guillaume Benjamin Amand DUCHENNE (1806-1875)

Duchenne, also known as Duchenne de Boulogne (Figure 3), did his medical studies in Paris, then came back to work in his native town of Boulogne, and thereafter moved back again to Paris for familial reasons (Borg, 1992; Clarac et al., 2009; Cuthbertson, 1979; Jay, 1998; Parent, 2005a, 2005b; Pearce, 1999; Rondot, 2005). In order to relieve his the patients' pain, he took an interest in electropuncture, but realized that this method was especially useful for analyzing the most complex muscle contractions. Without receiving any advice, he went around the Parisian hospitals "with an electric box and a battery" and two rheophores (electrodes) to cause perform a very specific stimulation patterns (?) in patients.

He bonded with Trousseau at the Hôtel-Dieu hospital, with Pierre François Olive Rayer (1793-1867) at the Charité hospital and - above all - with Charcot, who received him at the Salpêtrière hospital and on whom he had a great influence. His procedures on localized electrical stimulation with faradic current were published at the Académie des Sciences (French Academy of Sciences) in 1847. Using this technique as well as muscle biopsy, Duchenne thus described numerous neuromuscular pathologies (Nelson and Genain, 1989; Reincke and Nelson, 1990). In 1861 he commented on the medical history of a young boy suffering from congenital hypertrophic paraplegia and described it with more accuracy in 1868 (Duchenne, 1868; Brody and Wilkins, 1868), coining and coined the term "pseudohypertrophic muscular dystrophy" for this pathology "pseudohypertrophic muscular dystrophy", known today as Duchenne muscular dystrophy. As early as 1850 - at the same time as François Amilcar Aran (1817-1861) - he studied progressive muscular atrophy (later to be named Aran-Duchenne syndrome) and distinguished it from other paralyse ? (pluriel) In 1858 Duchenne described a type of progressive locomotor ataxia, better known today as tabes dorsalis or neurosyphilis, thanks to the reference work of Moritz Heinrich Romberg (1795-1873) (Duchenne, 1858).

Duchenne contributed in quite an original way to the analysis of the muscles involved in facial expressions and drew a complete explanation of emotions out of it (Cuthbertson, 1985; Duchenne, 1862b; Hueston and Cuthbertson, 1978). Few were interested in his results in France, whereas in England Charles Robert Darwin (1809-1882) used used photographs from Duchenne in his book *The Expression of the Emotions in Man and Animals* published in 1874 (Darwin, 1874). Duchenne developed a passion for photography from the very beginning of his career (Cuthbertson and Hueston, 1979). He used collodion negatives and albumen prints. He photographed all the effects of electrical stimulation with faradic current of the facial muscles as well as the pathological responses and put them together in an album published in 1862 (Figure 2 34) (Duchenne, 1862a). He also made microscope photographs and produced a detailed atlas of the human brainstem that he presented at the Académie Nationalde de Médecine in 1869. He published two major works on muscular activity : *De l'électrisation localisée et son application à la physiologie, à la pathologie et à la thérapeutique* (A Treatise on Llocalized eElectrization) in 1855 (Duchenne, 1855) and his major book *Physiologie des mouvements démontrée à l'aide de l'expérimentation électrique et de l'observation clinique et applicable à l'étude des paralysies et des déformations* (Physiology of Mmotion Ddemonstrated by Mmeans of Eelectrical sStimulation and cClinical Oobservation and Aapplied to the sStudy of Pparalysis and Ddeformities) in 1867 (Duchenne, 1867; Ostini, 1993). Of particular interest Iin this book, is the description of focal spasms such as the

writer's cramp and musician cramps is of particular interest as well as the description of other focal spasms (which are currently described as examples of task-specific dystonias).

Jean-Martin CHARCOT (1825-1893)

Charcot (Figure 4) is universally recognized as the founder of French neurology (Clanet, 2008; Gelfand et al., 1996; Goetz et al., 1995; Massie, 2004; Tan and Shigaki, 2007; Wechsler, 1953). He was a médecin des hôpitaux de Paris and headed a department at the Salpêtrière hospital in 1862, at the same time as his friend Alfred Vulpian. He succeeded Vulpian as a professor of pathology at the Faculty of Medicine of Paris in 1872 and then became the first professor holding to hold the chair of the diseases of the nervous system, created for him at the Salpêtrière hospital in 1882. He was a member of the Académie Nationale de Médecine and of the Académie des sciences (1883). Charcot advocated the anatomical-clinical method in neurology (Charcot, 1879), contributing to the description or delineation of several syndromes and diseases, such as multiple sclerosis and Parkinson's disease (Charcot, 1868; Charcot and Vulpian, 1862a) and described eponymous conditions such as amyotrophic lateral sclerosis- also known as Charcot's disease- (Charcot, 1874; Charcot and Joffroy, 1869; Charcot and Marie, 1885) and Charcot-Marie-Tooth disease (Charcot and Marie, 1886). He later mostly focused on hysteria and hypnosis (Bogousslavsky et al., 2009; Faber, 1997; Goetz, 2007; Lhermitte, 1950) and developed organicist conceptions that the School of Nancy strongly opposed.

While holding his chair at the Salpêtrière, Charcot had the merit, -and not the least, of his merits was to- of surrounding himself with major collaborators such as Alix Joffroy (1844-1908), Albert Gombault (1844-1904), Paul Richer (1844-1933) (Charcot and Richer, 1900), Georges Debove (1845-1920), Fulgence Raymond (1844-1910), Albert Pitres (1848-1928), Édouard Brissaud (1852-1909) (Charcot et al., 1891) Gilbert Ballet (1853-1916), Pierre Marie (1853-1940), Joseph Babinski (1857-1932), Georges Gilles de la Tourette (1857-1904), Alexandre Achille Souques (1860-1944) and many others. It is difficult, today, to take the full measure of what the glory of the neurologist of the Salpêtrière hospital was like at the end of the XIXth Century. His reputation on both national and international levels came from the lectures he gave on Tuesdays (the less technical and more for the aimed at general public) (Charcot et al., 1887; Charcot and Bourneville, 1872, 1876), on the side of as well as from his private Friday lectures. Exclusively for scientists, they attracted the tout Paris (Parisian smart set). The famous painting from André Brouillet (1857-1914) *Une leçon clinique à la Salpêtrière* (A clinical Lecture at the Salpêtrière) displayed at the salon of 1887 immortalized them (Figure 5). On this painting we can see the "master" Charcot examining his famous hysterical patient Blanche Witmann (1859-1913), physically held up by his assistant Babinski. Around them are most of Charcot's students and some Parisian important figures. In 1881 Charcot was celebrated as a hero at the Medical congress of London. Sigmund Freud (1859-1913) spent a few months in the service unit of Charcot (from October 1885 to February 1886) and then kept friendly relations with him. He translated his lectures into German and preserved kept a reproduction of Brouillet's painting in his living room during for all his lifetime.

Alfred VULPIAN (1826-1887)

Vulpian (Figure 6) began his medical studies under the influence of Pierre Flourens (Breathnach, 1987; Cousin, 2002; Dellon and Dellon, 1993; Pearce, 2002b; Vulpian, 1880). His MD thesis dealt with was about the origin of cranial nerves, from the 3rd to the 10th (Vulpian, 1853). He became successively interne des hôpitaux de Paris and associate

professor. In 1862, he was named he along with his friend Charcot, were named Head of two different departments at the Salpêtrière hospital. Vulpian was named full professor of the chair of pathology in 1866, succeeding Jean Cruveilhier (1791-1874). In 1872 he let the chair of pathology to Charcot and took hold of the chair of experimental and comparative pathology (Vulpian and Brémont, 1866). His work, although slightly overshadowed by the glory of his student Dejerine and that of Charcot (Bogousslavsky et al., 2011), is extensive in the field of clinical anatomy and physiology of nervous diseases.

In 1859 Vulpian was the first to have the idea of growing animal tissues by isolating tadpole tail fragments, thus obtaining the survival of cells without any proliferation. Vulpian described the conjugate deviation of the head and eyes in apoplectic ictus in 1864, and the clinical spectrum of multiple sclerosis in 1866 (Rascol and Clanet, 1982; Vulpian, 1866) with Charcot, by distinguishing it from other forms of tremor such as paralysis agitans.. They also studied this latter condition and (which they named it Parkinson's disease) (Charcot and Vulpian, 1862c), as well as amyotrophic lateral sclerosis. Vulpian was the first to demonstrate that tabes dorsalis - contrary to the general opinion of that time - does not primarily affect the posterior columns of the cord (Charcot and Vulpian, 1862b). He was a refined clinician and coined, for example, the term syncinésie (synkinesia). He was elected to the Académie des Sciences and was the dean of the Paris Medical Faculty from 1875 until 1881.

Désiré-Magloire BOURNEVILLE (1840-1909)

Bourneville (Figure 7) was born in Normandy, in north-western France and studied medicine in Paris (Anonymous, 2005; Poirier and Chrétien, 2000a; Poiret and Signoret, 1991a, 1991b; Poisson, 2008). He became intern/ resident of Charcot in 1868 and, from then on, had a huge impact on him, in particular for his works on hysteria (Bourneville, 1876; Bourneville and Voulet, 1972). He was appointed médecin-aliéniste des hôpitaux de Paris and developed new methods for the management of the mentally retarded, at the Bicêtre hospital (Bourneville, 1905a, 1905b; Reyre, 1989). His name remains associated with the discovery of the sclérose tubéreuse de Bourneville (Bourneville's tuberous sclerosis) (Bourneville, 1880a, 1880b) and the description of the myxoedème congénital (congenital myxedema). Bourneville was a republican, a freethinker, a freemason, an anticlerical (Brais, 1993) and was very involved in the major political struggles of the French Third Republic. He was successively conseiller municipal (municipal councillor) of Paris, député du département de la Seine (deputy of the Seine County) and belonged to the extreme left-wing of the parti radical (French radical party). Bourneville founded the municipal nurse schools (Bourneville, 1881; Collière, 1999) and vigorously fought for the laicisation secularisation of hospitals and for the promotion of cremation. He founded the journals Archives de Neurologie and Le Progrès Médical.

Paul RICHER (1849-1933)

Intern resident of Charcot in 1878, Richer (Figure 8) was both a physician and an artist. In 1888 and under the direction of Charcot, he founded the Nouvelle Iconographie de la Salpêtrière with Georges Gilles de la Tourette (1857-1904) and Albert Londe (1858-1917), which replaced the previous Iconographie Photographique de la Salpêtrière. The main interest of this scientific journal lay in the numerous photographs, coloured lithographs and drawings by Paul Richer which illustrated the articles on the neurological cases observed at the Salpêtrière hospital (Charcot and Richer, 1888, 1900; Richer, 1892; Richer and Meige, 1895). Richer published two brilliantly illustrated books in collaboration with Charcot entitled : Les Démoniaques dans l'art (Demoniacs in art, 1887) (Charcot and Richer, 1887) and Les Difformes et les malades dans l'art (The Deformed and the dDiseased in art, 1889) (Charcot and Richer, 1889). He was also a sculptor and described human postures at rest and in motion (Richer, 1890). and hi His works include Premier Artiste (First Artist, 1890), Le Bûcheron de

la forêt de La Londe (Lumberjack of the La Londe woods, 1899), Le Monument de Pasteur (A new Monument to Pasteur, 1903) and Tres In Una (Three in One, 1913), among others. Richer was a laureate of Institut de France, member of the Académie de Médecine (1898) and the holder of the chair of artistic anatomy of the École des Beaux-Arts (Paris Fine Arts School) (1903) (Richer, 1920a, 1920b) where Henry Meige (1866-1940) succeeded him. He was also the president of the Société française d'Histoire de la Médecine (French Society for the History of Medicine) (1907-1908).

Henri PARINAUD (1844-1905)

Parinaud (Figure 9) was born in Bellac (Haute-Vienne French département/ County in the center of France) and began his medical studies in Limoges (Ouvrier, 1993). He then studied in Paris, where he was successively externe and interne des hôpitaux de Paris (extern/ non residential student and intern/ resident of the hospitals of Paris), and served in the Red Cross ambulance corps during the Franco-Prussian war in 1870. Parinaud defended his MD thesis on optic neuritis in pediatric acute meningitis (Parinaud, 1877a) and Charcot handed him the direction of the service of ophthalmology that which was belonged to his chair of the diseases of the nervous system. Parinaud published numerous works, notably on optic neuritis and strabismus (Parinaud, 1879a, 1879b, 1893). His name remains associated with upgaze paralysis (Parinaud's syndrome, which is caused by lesions of the mesencephalic area) (Parinaud, 1877b, 1886), to with the Parinaud's oculoglandular syndrome he described in 1889 (and that has subsequently been associated with the cat-scratch disease) (Parinaud, 1889), as well as to with the optometric scale (Parinaud scale) for the assessment of visual acuity (Parinaud, 1888), which is still in use today. Parinaud is considered as one of the pioneers of French ophthalmology and particularly neuro-ophthalmology (Parinaud, 1898). Albert PITRES (1848-1928)

Pitres (Figure 10) was born in Bordeaux and received his medical training in Paris, where he became resident of Charcot and Dejerine, and attended at Étienne Jules Marey's (1830-1904) and Ranvier's respective laboratories. In 1877 he defended his MD thesis presided over by Charcot and entitled: *Recherches sur les lésions du centre ovale des hémisphères cérébraux étudiées au point de vue des localisations cérébrales* (Researches on the Lesions of the Cerebral Hemispheres Ooval Centres with Particular Focus on Cerebral Localizations) (Pitres, 1877) and was admitted to the agrégation (French civil service competitive examination for positions in the public education system, either in secondary or higher education) in 1878. He studied the different brain areas with Charcot, who was very much influenced by the British neuroscientist David Ferrier (1843-1928). He defended the doctrine of the "localizationism" and supported the idea of autonomous centres with specific functions (Charcot and Pitres, 1877, 1878a, 1878b, 1883, 1895). Albert Pitres witnessed the beginning of hypnosis during the lectures of Charcot in 1877-1878. Pitres then returned to Bordeaux where he became a professor of anatomy and histology in 1880 and then of internal medicine the next year. In 1884 he was the first to describe a clinical case of pure agraphia, and showed that an acquired motor ability could also be localized (Pitres, 1884a; Lorch and Barrière, 2003). Pitres also contributed to the study of aphasia and described amnesic aphasia (Pearce, 2005; Pitres, 1894, 1895, 1898). He continued his works on hysteria by following the ideas of Charcot's ideas. His book *Les Leçons cliniques sur l'hystérie et l'hypnotisme* (Clinical Lectures on Hysteria and Hypnotism) was published in 1891 (Pitres, 1891). However, he gave up this study topic after Charcot's death and resumed his works on memory and peripheral nerves. He was the dean of the Faculty of Medicine of Bordeaux. His name is associated with two signs: the *signe du sou de Pitres* (Pitres' coin sign) in pneumothorax and

the signe de Pitres (Pitres' sign) in tabes dorsalis (hypoesthesia or anesthesia of the scrotum) (Pitres, 1884b).

Jules Joseph DEJERINE (1849-1917)

Dejerine (Figure 110) was a student of Vulpian but not of Charcot (Anonymous, 1969; Bassetti and Jagella, 2006). He was a médecin des hôpitaux de Paris, an associate professor and headed a department at the Bicêtre hospital (1887), before moving to the Salpêtrière hospital in 1895. He then became professor of Medical history (1901) then of Medical Pathology (1907), he succeeded Fulgence Raymond (1844-1910) at the chair of the diseases of the nervous system in 1911. In 1888, Dejerine married Augusta Klumpke (see next biography), an American medical student and the first woman to pass the competitive examination to become an intern/ resident of the Paris hospitals in 1886. She would remain an effective collaborator to her husband. Among Dejerine's numerous publications, the most famous are the Landouzy-Dejerine syndrome or facio-scapulo-humeral muscular dystrophy (1885) (Landouzy and Dejerine, 1885), the Dejerine-Sottas hypertrophic neuropathy (1893) (Dejerine and Sottas, 1893), and in collaboration with André Thomas (1900) the sporadic form of the olivo-ponto-cerebellar atrophy (OPCA) (Dejerine and Thomas, 1900) and most importantly the Dejerine-Roussy syndrome caused by a lesion in the posterior thalamus (1906) (Dejerine and Roussy, 1906; Pearce, 1988). Dejerine did also important contributions on reading and writing, and particularly on word blindness (Bub et al., 1993; Dejerine, 1892; Henderson, 1984).

Three of his books remain especially important today: the *Traité des maladies de la moelle épinière* (Treatise on spinal Cord Diseases) in collaboration with André Thomas (Dejerine and Thomas, 1902) and the two masterpieces that are *Anatomie des Centres Nerveux* (Anatomy of the Nervous Centers, 1895-1901) (Dejerine and Dejerine-Klumpke, 1895), a monumental piece of work with a rich iconography established from large anatomical sections and for which the participation of Mrs Dejerine-Klumpke was of critical importance, and *Sémiologie des affections du système nerveux* (Semiology of the Diseases of the Nervous System, 1914) (Dejerine, 1914), which is today considered as one of the greatest classics of the francophone French neurological literature. Although the major part of his work deals with about organic neurology, Dejerine turned to a new field in the later stages of his career. Like many eminent neurologists of that time he became interested in psychology, functional disorders and hysteria. He published *Les manifestations fonctionnelles des psychonévroses, leur traitement par la psychothérapie* (The Psychoneuroses and Their Treatment by Psychotherapy) with E. Gauckler in 1911 (Dejerine and Gauckler, 1911).

Augusta DEJERINE-KLUMPKE (1859-1927)

Augusta Klumpke, Dejerine's wife (Figure 110) was born in San-Francisco and studied at the Faculty of Medicine of Paris (Bauer, 1974; Bogousslavsky, 2005; Ellis, 2011; Satran, 1974; Schurch and Dollfus, 1998; Yildirim and Sarikcioglu, 2008). After a long struggle against the unwillingness of the medical body profession and the hospital administration unwillingness, she obtained the authorization to take the hospital competitive examination. She was appointed extern/ non-residential student in 1882 and became the first woman female resident of the Paris hospitals in 1886. As an extern/ non residential student she published — on her own - the princeps article on the lower brachial plexus paralysis in *Revue de médecine*,

today known as the Klumpke's paralysis, or Dejerine-Klumpke syndrome (Anonymous, 1999; Dejerine-Klumpke, 1908; Klumpke, 1885; Ulgen et al., 2008). As When she was an intern/resident of Professor Alfred Hardy (1811-1893) at the Charité hospital, her chief resident was Jules Dejerine who became her husband in 1888. She defended her MD thesis on *Les Polynévrites en général, les paralysies et les atrophies saturnines en particulier* (About Ppolyneuritis in Ggeneral and Ssaturnian Ppalsies and Aatrophies in Pparticular) in 1889 (Dejerine-Klumpke, 1889). Mrs Dejerine-Klumpke did important works on neuroanatomy (Dejerine-Klumpke and Jumentié, 1910; Lecours and Caplan, 1984; Schoja and Tubbs, 2007) and took an active part in the writing of *Anatomie des centres nerveux* ("Anatomy of the Nnervous Ccenteres"), co-signed with her husband (Dejerine and Dejerine-Klumpke, 1895). She was the president of the Société Société de Neurologie de Paris in 1914 and 1915. During World War I she headed a a service consisting of 300 beds unit, ofcaring for wounded patients at the Salpêtrière hospital. She became Officier de la Légion d'Honneur (Officer of the Legion of Honor) in 1921.

Édouard BRISSAUD (1852-1909)

Brissaud (Figure 121) was successively resident of Paul Broca (1824-1880), Ernest-Charles Lasègue (1816-1883) and Charcot (Freeman, 1953; Poirier, 2010, 2011; Tatu, 2011). He became médecin des hôpitaux de Paris, agrégé, professor of the history of medicine (1899) then of medical pathology (1900). He dedicated many of his works among others to infantilism (and described its thyroid form) (Brissaud, 1897) and, gigantism (Brissaud and Meige, 1895a), asthma (Brissaud, 1896), Llittle disease (Brissaud, 1894), intonation in aphasia (Brissaud, 1901), herpes zoster, spinal metamerism and, tabetic arthropathy. Brissaud did two famous lectures on Parkinson's disease and on, tics and spasms (Brissaud, 1895a, 1895b). Brissaud He notably studied hemifacial spasm and torticollis, with photographic illustrations (Brissaud, 1895b; Colosimo and Berardelli, 2010). He proposed the term torticollis mental ("mental torticollis") on the basis of the description of an important feature (Brissaud, 1895b) hemifacial spasm and mental torticollis, the later of which presenting an important sign subsequently denominated as geste antagoniste ("antagonistic movement") by his pupils Henry Meige (1866-1940) and Eugène Feindel (1862-1930). He demonstrated the automatic-voluntary dissociation between the voluntary expression and facial expression in pseudobulbar palsy. In 1896, a few months after Roentgen's dis-covery of X-rays, Brissaud and Albert Londe (1858-1917) used this new method to localize set an intracranial projectile and on the radiographlocalize its image, with awhose fixture time was then of one hour and a half! Brissaud was the project initiator of Charcot and Bouchard famous *Traité de médecine* (Treatise of Medicine) (Charcot et al., 1891) and of *Pratique Médico-Chirurgicale* (Medical-Surgical Practice) published in collaboration with Paul Reclus (1847-1914) and Adolphe Pinard (1844-1934) (Brissaud et al., 1907). In 1893, he published an atlas on human brain anatomy (Brissaud, 1893). The same year, hWith Pierre Marie he founded the *Revue Neurologique* journal with Pierre Marie, which was supported by Charcot who published its very first article. After the death of Charcot in 1893, Brissaud replaced him at his Chair during for one year and published his *Leçons sur les maladies du système nerveux* (Lectures on the Ddiseases of the Nnervous Ssystem) (Brissaud and Meige, 1895b). Brissaud was one of the founding members of the Société de Neurologie de Paris (1899).

Pierre MARIE (1853-1940)

Pierre Marie (Figure 132) was appointed interne des hôpitaux de Paris in 1878 and was a brilliant student of Charcot (Anonymous, 1983; Cohen, 1953; Goetz, 2003; Pearce, 2004a, 2004b; Poirier and Chrétien, 2000). At the end of his residency, he defended his M.D. thesis on Graves's disease (Marie, 1883) and became chief resident under the direction of Charcot. Together they described progressive muscular atrophy, later known as Charcot-Marie-Tooth disease (Charcot and Marie, 1886). He was associate professor and head of a department at the Bicêtre hospital and then at the Salpêtrière hospital, in 1895 and 1911 respectively. He was also a professor of pathology in 1907 and a member of the Académie Nationale de Médecine. He described acromegaly (Pierre Marie disease) (Marie, 1886), cerebellar tonsil herniation (Simonetti et al., 1997) and hereditary cerebellar ataxia (Marie, 1893). He contributed to the study of bone and joint pathology (Ryckewaert and Naveau, 1984), and described hypertrophic pulmonary osteo-arthropathy (Marie, 1890), hereditary cerebellar ataxia, hereditary cleidocranial dysostosis (Marie and Santon, 1898) and rhizomelic spondylosis (Benoist, 1995; Marie, 1898). His work on aphasia (Marie, 1906) was opposed to that of Paul Broca and Karl Wernicke (1848-1905), which resulted in famous and intense debates with Dejerine in 1908 (Brais, 1992; Roch-Lecours, 1999). Along with Édouard Brissaud, he founded the journal *Revue de Neurologie* in 1893, and the *Société de Neurologie de Paris* in 1899, of which he was the first General Secretary. He published various works dedicated to the neurological sequels of due to World War I, in collaboration with Charles Foix (1882-1927) and Henry Meige (1866-1940), among others (Marie and Foix, 1917). At the age of 64, he replaced Dejerine at the chair of the diseases of the nervous system, which he held for six years, from 1917 to his retirement in 1923.

Georges Édouard Brutus GILLES DE LA TOURETTE (1857-1904)

Gilles de la Tourette (Figure 143) was intern/ resident (1884) then chief resident (1887-1889) of Charcot, médecin des hôpitaux de Paris (1893) and agrégé of medicine and forensic medicine (1895) (Goetz et al., 2001; Krämer and Daniels, 2004; Lees, 1986; Rickards and Cavanna, 2009; Walusinski and Bogousslavsky, 2011; Walusinski and Duncan, 2010). He is mostly famous for the *maladie des tics* (tic disorder) he described in 1885 and that which is named after him (Gilles de la Tourette, 1885, 1899; Goetz and Klawans, 1982; Lajonchère, 1996; Stevens, 1971). He also worked on hysteria and hypnotism (Bogousslavsky et al., 2009) and published two works on hypnotism and hysteria on this topic: *L'Hypnotisme et les états analogues au point de vue médico-légal* (Hypnotism and Analogous States from the Medico-Legal Point of View, 1887) (Gilles de la Tourette, 1887) and *Traité clinique et thérapeutique de l'hystérie d'après l'enseignement de la Salpêtrière* (Clinical and Therapeutical Treatise on Hysteria Based on the Salpêtrière Lectures 1891) (Gilles de la Tourette, 1891). Other medical publications are a treatise on the diseases of the nervous system, a study on gait and early description of restless legs syndrome (Gilles de la Tourette, 1886, 1898; Konofal et al., 2009). He also wrote a lot, was also a prolific writer, and notably produced numerous works on the Poitou Province in the centre of France and a biography of Théophraste Renaudot (1586-1653), a physician native from Loudun (as well as was Gilles de la Tourette) and the founder of the very first French journal in 1631, *La Gazette*. Gilles de la Tourette suffered from a general paralysis caused by a tertiary syphilis and his mental condition gradually worsened. He died at the age of 47 in the psychiatric hospital of Lausanne where he had been confined.

Joseph BABINSKI (1857-1932)

Babinski (Figure 145) was born in Paris to Polish parents who had fled Warsaw (Ambrosius and Michalak, 2009; Bayley, 1961; Gasceki and Kwieciński, 1995; Moreau, 1958; Philippon and Poirier, 2009; Poirier, 2007, 2008; Skalski, 2007). He studied medicine in the French capital, where he became resident of Vulpian and of Victor Cornil, and was chief resident of Charcot (1885-1887) (Massie, 2004). Babinski was appointed *médecin des hôpitaux de Paris* in 1890, but failed the *agrégation* in 1892, because of some quarrel between Charcot and the president of the jury, Charles Bouchard (1837-1915). As a consequence Babinski would never be a professor. He remained head of the Neurologia medical department at the Pitié hospital during for his entire career, first in the old Pitié hospital until 1912 and then in the new Pitié hospital which was opened the same year, in a contiguous area of with the Salpêtrière hospital. Babinski did considerable contributions to the study of diseases of the nervous system (Babinski, 1913, 1934). He was above all a semiologist and his constant aim was to discover characteristic signs that allowed allowing to make the distinction between organic pathology and functional, hysterical disorders. During a presentation of 28 lines at the Société de Biologie (French Society of Biology) in 1896, he showed during a presentation of 28 lines at the Société de Biologie (French Society of Biology) that stimulation of the sole of the foot caused an extension of the great toe in patients with a lesion of the pyramidal tract whereas it resulted caused in a flexion in normal subjects (Babinski, 1896). This inversion of the cutaneous plantar reflex sign would very quickly be called Babinski sign (Goetz, 2002; Lance, 2002). After the death of Charcot, Babinski reconsidered the position of his master on hysteria and suggested to rename it *pithiatisme* (pithiatism) in order to show that it is a disorder caused by suggestion and that can be treated by persuasion (Allilaire, 2007; Babinski et al., 1918). Thanks to the long observation of his patient Henri Mouninou, Babinski refined the cerebellar semiology and described *asynergia* (i.e. cerebellar ataxia), *hypermetria* and *adiadochokinesia* (Babinski, 1899, 1902a, 1902b, 1902c, 1909, 1925; Babinski and Tournay, 1913). Babinski finally was at the origin of the birth of French neurosurgery by encouraging his students Clovis Vincent (1879-1947) and Thierry de Martel (1876-1940) to become accomplished neurosurgeons (Babinski et al., 1912). Babinski lived all his life with his older brother Henri Babinski (1855-1931), who was an engineer but was mostly famous as a distinguished cook. As "Ali Bab", he wrote a classic cookbook entitled *Gastronomie Pratique: études culinaires* (Practical gGastronomy: Cculinary sStudies) (Babinski, 1907). Joseph Babinski suffered from Parkinson's disease at the end of his life and died one year only after his brother.

André THOMAS (1867-1963)

André Thomas (Figure 165) made spent his entire medical career in Paris (De Ajuriaguerra, 1955; Duckett, 2000; Hécaen and Bonduelle, 1967; Polonovski, 1999; Sigwald, 1967; Soriano, 1967). He was first an intern/ resident at the Bicêtre hospital, where Dejerine was his mentor, then worked at the Salpêtrière and later at the Saint- Joseph Hospital. It is noteworthy that when he retired, he focused on the study of child neurology (Thomas and Saint Anne Dargassies, 1952; Thomas and De Ajuriaguerra, 1949). Although André Thomas did numerous publications in neurology, as for example on spinal cord with Dejerine (Dejerine and Thomas, 1902), Hhis most important research was on the study of the cerebellum. In parallel with Babinski in France and Gordon Morgan Holmes (1876-1965) in Great Britain, he was one of the main contributors to the study of cerebellar disorders at the turn of the XIXth and XXth centuries (Thomas, 1897, 1905; Thomas et al., 1914; Thomas and Jumentié, 1909). While Babinski reported *asynergia*, *hypermetria* and *adiadochokinesia*, André Thomas added *dysmetria*, *dyschronometria* (Thomas, 1937) and *passivité* (i.e. hypotonia) with the pendular reflexes. Gordon Holmes further characterized hypotonia (Stewart-Holmes maneuver), delayed initiation or arrest of movement and action tremor, and identified rubral

tremor (now called Holmes tremor). In 1900 Dejerine and Thomas described a new syndrome: olivopontocerebellar atrophy (OPCA) (Dejerine and Thomas, 1900). This degenerative disease occurs sporadically at middle or elderly age. The main pathological feature is a severe atrophy of the cerebellum, inferior olives and protuberance pons. OPCA was subsequently recognized by others with in some cases, an akinetic rigid syndrome. In the 1960s Shy-Drager and striatonigral degeneration syndromes were described by others. Important histopathological data in the late 1980s showed that these two entities and OPCA shared common oligodendroglial inclusions with different anatomical distributions. These three syndromes were later coalesced under the term multiple system atrophy (MSA).

Georges MARINESCO (1864-1938)

Georges Marinesco (Figure 176), also known as Gheorghe Marinescu, was born in Romania and received most of his medical education at the Brâncoveanu (Brancovan) Hospital and worked at the laboratory of histology and bacteriology of Victor Babes (1854-1926) (Buda et al., 2009; Chudley, 2003; Petresco, 1964). Marinesco later came to Paris to receive further education in neurology with Charcot at the Salpêtrière hospital, where he was in close contact with Pierre Marie, Babinski and Raymond. He also worked in Germany with Karl Weigert (1845-1904) in Frankfurt and Emil Du Bois Reymond (1818-1896) in Berlin. Back in Romania he held the very first chair of neurology in Bucharest and founded the Romanian School of Neurology. He published an atlas on the pathological histology of the nervous system with Victor Babes and Paul Oskar Blocq (1860-1896) (Blocq et al., 1892). Marinesco's contribution to science is outstanding. He had indeed the ingenuity to put to use new methods in practice, as soon as they were available, especially roentgen rays, film camera and Nissl method. The book he published on this latter topic dealt with the study of normal nerve cells and reparative processes in neurofibrils in the degenerated cells following nerve section (Marinesco, 1905a, 1905b, 1918, 1920). With Blocq, he reported a peculiar case of parkinsonian tremor related to tuberculosis abscesses of the mesencephalon (Blocq and Marinesco, 1893), and discovered the senile plaques (Marinesco, 1911, 1928). Marinesco was the first to carry out hypophysectomy in animals in order to demonstrate that they could live for a few weeks without pituitary gland (Marinesco, 1892). He also studied a new form of familial spastic paraplegia with extrapyramidal motor symptoms, clinical-anatomical aspects of the thalamic syndrome, juvenile form of familial amaurotic idiocy and degenerative changes in the spinal cord following amputations (Marinesco-Sjögren syndrome) (Marinesco et al., 1925). He maintained close academic relationships with his colleagues in Paris. In 1909 he published a voluminous work on the nerve cell entitled *La cellule nerveuse* (The Nerve Cell) that was later overshadowed by Ramón y Cajal's works (Marinesco, 1909).

Achille Alexandre SOUQUES (1860-1944)

Achille Alexandre Souques (Figure 187) studied medicine in Paris, went to work at the Salpêtrière Hospital, became Charcot's last interne (resident), then Brissaud's chef de clinique (assistant professor) (Alajouanine, 1945, 1953; Broussolle et al., 2010; Société Française de Neurologie, 1945). In 1898 he became a hospital consultant and worked successively at the Charité, the Hôtel-Dieu, the Ivry and the Bicêtre hospital. He returned to the Salpêtrière Hospital in 1917 where he was appointed Professor of Neurology. With Pierre Marie, Joseph Babinski and others, Souques founded the Paris Neurological Society in 1899, with Pierre Marie, Joseph Babinski and others. He was elected to the Académie Nationale de Médecine in 1918 and retired in 1925.

Souques described several important neurological signs. One sign bears his name: *Signe des cils de Souques* (i.e. Souques' eyelashes sign) in forms of facial paralysis. In this

case, the involvement of the upper facial nerve territory can be detected when the patient is asked to strongly close his eyes strongly: the eyelashes are less covered by the eyelids and thus appear longer compared to those of the non-paralysed side. Souques also studied speech and language and described palilalia in 1908 (Souques, 1908). In this syndrome, patients affected by this syndrome cannot help repeating the same word or sentence. This speech disorder is frequently seen in stroke patients, especially in case the course of pseudobulbar palsy and in parkinsonian syndromes. In 1915, Souques coined the term *camptocormia* with Mrs Rosanoff-Saloff to describe the abnormal curve of the trunk in injured trench warfare soldiers (Souques and Rosanoff-Saloff, 1915). Some soldiers had a *camptocormia* due to the stress of the anticipation of the battle, whereas others were afraid to suffer again from a previous spinal cord injury. Nowadays, *camptocormia* is considered not only as a psychogenic disorder, but is also described as part of Parkinson's disease, dystonia, myopathic processes and amyotrophic lateral sclerosis (Djaldetti et al., 1999; Skidmore et al., 2007)..

Souques' work on parkinsonian syndromes is remarkable. During an International Congress in Paris in 1921, he updated the scientific knowledge on Parkinson's disease and postencephalitic parkinsonian syndromes with In his famous 1921 exhaustive review during an International Congress in Paris, (Souques, 1921) he updated the scientific knowledge on Parkinson's disease and postencephalitic parkinsonian syndromes. Souques considered that post-encephalitic parkinsonism was indistinguishable from idiopathic Parkinson's disease and added two original contributions: first, abolition of automatic and associated movements, as the loss of the automatic swinging of the arms while walking; second, *kinésie paradoxale* (paradoxical kinesis). Souques used this term to refer to patients who generally could not move and were suddenly able to walk, or even to run. This phenomenon could also be seen in speech.

After his retirement, Souques did an important contribution to the study of neurology in the ancient Greece (Souques, 1936).

Georges GUILLAIN (1876-1961)

Guillain (Figure 198) succeeded his teacher Pierre Marie at the chair of Charcot, which he held from 1923 to 1947 (Alajouanine, 1962; Bonduelle, 1977, 1997; Mollaret, 1961). He was a member of the Académie Nationale de médecine and of the Académie des sciences, and he was Commandeur de la Légion d'Honneur (Commander of the Legion of Honor). With P. Léchelle, physician of Paris hospitals, he discovered the colloidal benzoic reaction (Guillain et al., 1922, 1926) and participated in the description of numerous eponymous syndromes. The most famous is the syndrome of acute polyradiculoneuritis or Guillain-Barré syndrome (also known as Guillain-Barré-Strohl) (Asbury, 1990; Guillain, 1938; Guillain et al., 1916). Guillain also wrote many articles on various affections of the nervous system such as myoclonus, notably palatal myoclonus with the description of the Guillain-Mollaret-Bertrand myoclonus triangle (1933) (Guillain and Mollaret, 1931, 1936; Guillain et al., 1933) and hereditary degenerative diseases of the spinal cord (Cestan and Guillain, 1900). He published several books such as the *Travaux neurologiques de guerre* (Wartime Neurological Works) with Jean Alexandre Barré (1880-1967) (Guillain and Barré, 1920), *L'Anatomie topographique du système nerveux central* (Topographic Anatomy of the Central Nervous System) with Ivan Bertrand (1893-1965) (Guillain and Bertrand, 1926). He also wrote a monograph on the Salpêtrière hospital with Mathieu (Guillain and Mathieu, 1925), and a biography of Charcot (Guillain, 1955). His student Théophile Alajouanine (1890-1980) succeeded him at Charcot's chair of the diseases of the nervous system in 1947.

Charles FOIX (1882-1927)

Charles Foix (Figure 2019) did his medical internship in Paris (1906) where he studied along with Pierre Marie and headed his laboratory at the Salpêtrière hospital (Breathnach, 1982; Caplan, 1990, 2010; Hillemand, 1976). Foix served during World War I in the neurological center of Salonica in Greece and was successively médecin des hôpitaux de Paris and associate professor in 1919 and 1923, respectively. He succeeded Clovis Vincent at the Ivry hospice (1924), where his reputation attracted many foreign visitors. His scientific contribution is considerable, both in terms of quantity and quality. One may especially mention his works on the anatomical lesions of Parkinson's disease (Foix, 1921), Lewy bodies and on palatal myoclonus (Foix and Hillemand, 1924). He also made an accurate description of the brain arteries and their territories (Foix and Hillemand, 1925a, 1925b; Foix and Masson, 1923; Tatu et al., 2005) and of the vascular syndromes depending on their pathology, with several original descriptions (Caplan, 1990; Foix, 1911; Foix et al., 1925; Foix and Hillemand, 1925c, 1925d). Charles Foix His other important publications with his contemporary colleagues are: on a fine anatomy of the mesencephalon sub-optic area (with Jean Nicolesco, 1895-1957) (Foix and Nicolesco, 1925), a cranial-cerebral topography (with Pierre Marie and Ivan Bertrand), several studies on cerebellar syndromes (with Pierre Marie and Thiers) and, late cerebellar atrophy with cortical predominance (with Pierre Marie and Alajouanine) (Marie et al., 1922). Among other contributions are his work on aphasia (with Pierre Marie) (Marie and Foix, 1917), necrotic myelopathy (Ferrel et al., 2009; Foix and Alajouanine, 1926) and anterior opercular syndrome (known as Foix-Chavany-Marie syndrome) (Foix et al., 1926). Charles Foix was also an author of prose and poetry.

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